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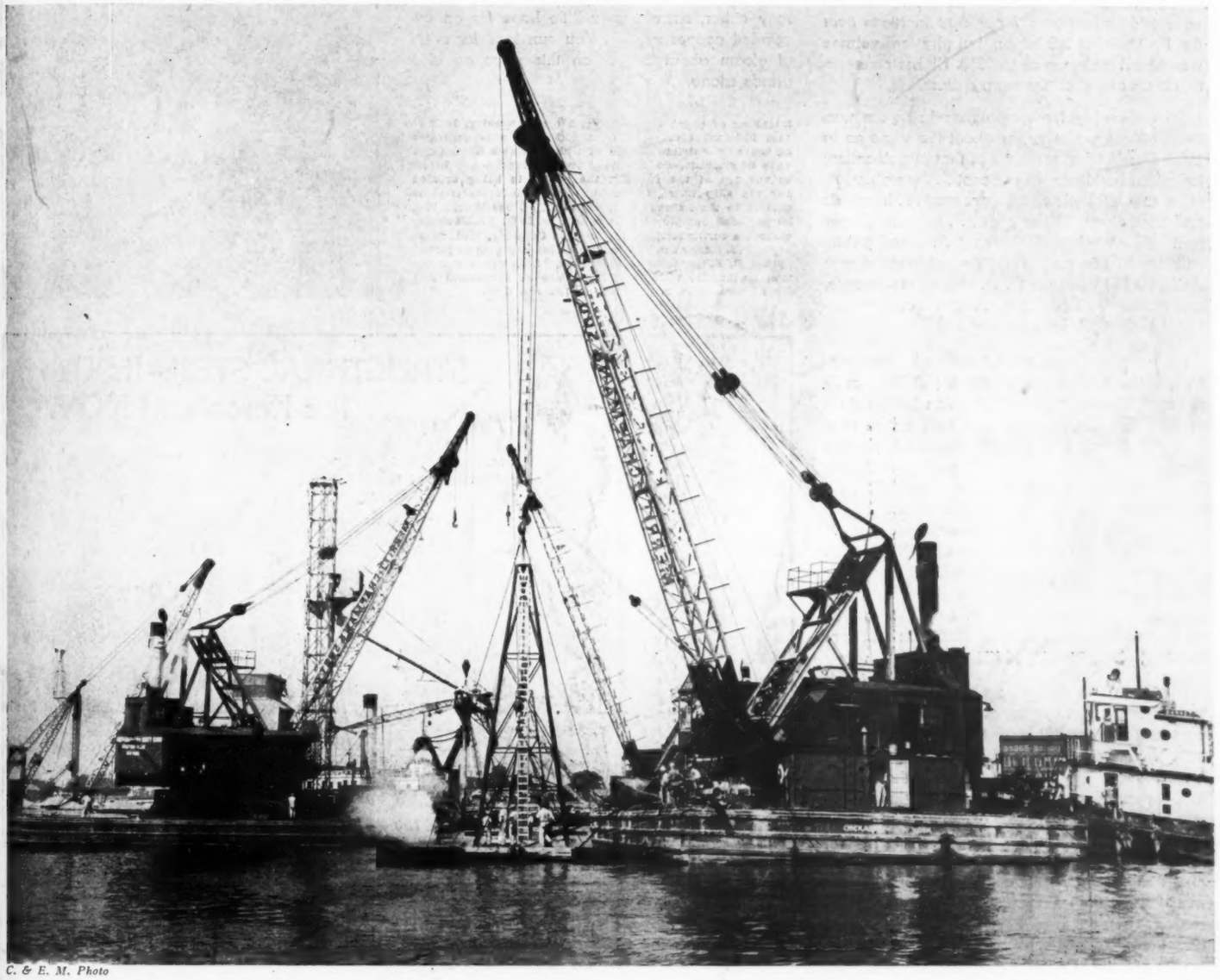
Contractors and Engineers Monthly

Vol. 49, No. 2 FEBRUARY, 1952 $4 a Year, 50 Cents a Copy



C. & E. M. Photo

The fifth of seven steel tubes, each 300 feet long, is sunk in the Elizabeth River for the Norfolk, Va., vehicular tunnel. Page 20 covers this Merritt-Chapman & Scott work.

• Grain Elevator and Dock
One contractor handles both concrete jobs at Mobile. Uses slip forms for head house and 42 tanks, drives pile foundation for dock. See page 5.

• Erosion-Control Tests
State tries out Krilium, a new product developed for stabilizing seeded slopes. What is it? Results? Turn to page 12.

• Lightweight Bridge Deck
Hot-mix made with lightweight aggregates solved a weight problem on a Portland, Oreg., bridge. Page 17.

• Tubes Sunk for River Tunnel
Seven of them—each 300 feet long—for the Elizabeth River Tunnel at Norfolk, Va. Story on page 20. Camera follows lowering of tube C, the fifth and deepest of the seven.

Covering the Field

• Road Grading in the Clouds
The going was tough on a mile-high Utah reroute job. Read about it, page 28.

• Aerial-Photo School
It's for highway personnel and it's a 4-week course. Methods, see page 37.

• Air-Base Expansion
Runways, parking aprons, taxiways, etc. constructed and paved with PCC and AC at Nellis Air Force Base. Page 42.

• Concrete Paving
Ten miles of U. S. 40 were turned into a dual highway in Ohio by adding a new 24-foot concrete strip. Page 48.

• Snow Removal
New Jersey started off on the right foot this winter. Page 54 tells how the Highway Department laid its plans.

• Care of Air Tools
An article on page 59 offers guidance on cleaning and lubrication.

• Skyscraper Soars in Texas
Eighteen stories high, in the windy oil city of Midland. Story on page 66.

• Test Piles for Viaduct
Hydraulic-jack pressure instead of dead-loading of test piles determined pile lengths for a viaduct. See page 70.

• Old Bridge, New Roadway
Sixty-eight-year-old Brooklyn Bridge won't know itself with its new 6-lane roadway. Story and pix, pages 76-77.

• Limerock Road Base
A blacktop pavement on a limerock base adds a 4-lane stretch, 12.15 miles long, to U. S. 1 in Florida. Page 86.

• Asphalt Lines Canal
The asphalt was catalytically blown onto Canal EL-20 in Washington. Page [illegible] describes methods and processing.

• Road Surface Treatment
Hand and drag brooming was an important part of a three-application bituminous treatment on a Louisiana state highway. Page 98 reports the job.

(You will find "In This Issue" on page 4)

NEWS AND VIEWS

of the construction industry—some statistics on construction volume during 1951; predictions for 1952

This time of year we always find ourselves in debt—to the U. S. Bureau of Internal Revenue, yes, of course, but also to the U. S. Department of Commerce for its year-end statistics on construction activity.

The Department tells us that last year, the U. S. spent almost $30 billion for new construction out of a gross national product of $327 billion. Dollar-wise this looks like a 7 per cent increase over the 1950 total of $28 billion, but **physical volume was about the same as in 1950.** Higher construction costs absorbed the extra dollars.

Private outlay for construction last year was $20.8 billion, we learn, or about the same as in 1950. **Here's what went up** in that classification: industrial buildings, 86 per cent . . . warehouses, office and loft buildings, 29 per cent . . . hospitals and institutions, 22 per cent . . . schools, 15 per cent . . . churches, 5 per cent . . . and public utilities, 18 per cent. **Here's what went down:** residential, 13 per cent . . . stores, restaurants, and garages, 10 per cent . . . social and recreational building, 35 per cent.

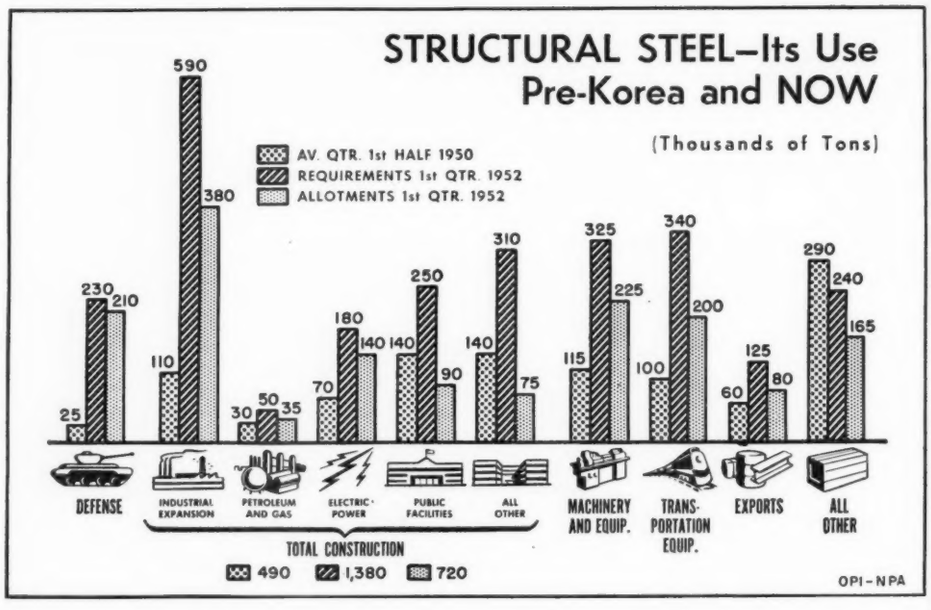
On the other hand, **public outlay for construction zoomed last year. It was over $9 billion,** or 27 per cent more than in 1950. **Here's what went up** in that classification: military and naval construction, 490 per cent . . . industrial building, 293 per cent . . . residential, 74 per cent . . . schools, 28 per cent ($1.4 billion, a new record!) . . . miscellaneous public-service enterprises, 13 per cent . . . sewer and water facilities, 5 per cent . . . hospitals and institutions, 4 per cent. **Here, alas, is what went down:** nonresidential building other than industrial, educational, and hospitals, 15 per cent . . . highways, 5 per cent ($2.2 billion as opposed to ($2.3 billion in 1950) . . . and conservation and development, 3 per cent.

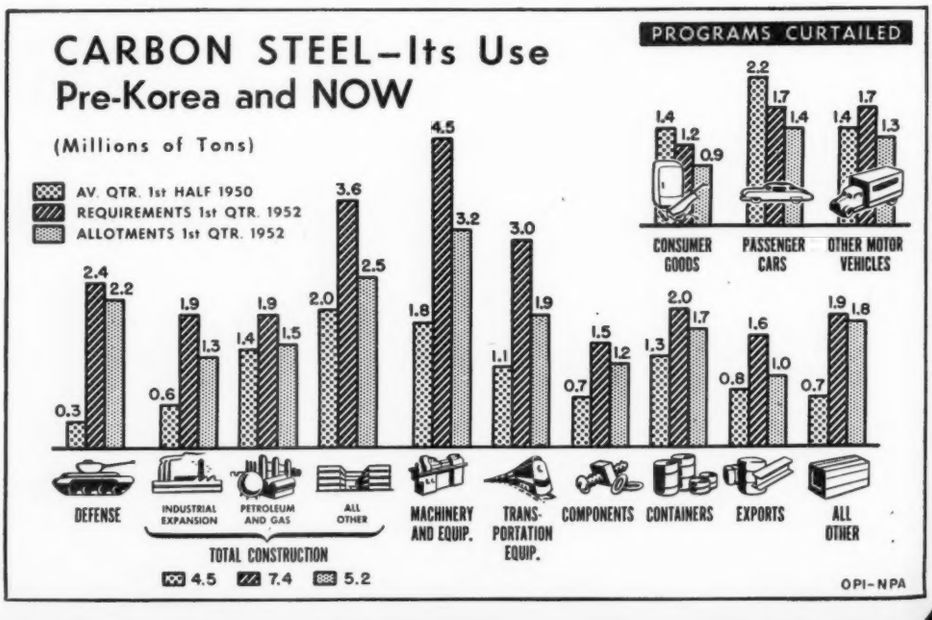
Appraising material supplies for the current year, **Government experts estimate that total 1952 construction may hit only $27 billion,** with the bulk of the drop in home building (starts were cut to 650,000 by the NPA). They think that industrial expansion, which hit a record dollar volume last year, may hold to or exceed its peak this year. **Commercial building, highways, schools, and hospitals will almost certainly find 1952 rough sledding.** Public-utility construction, too, will drop, except for pipelines and power. The reason is not far to seek. Last year, military and naval construction plus public industrial construction (atomic and arms plants) reached almost $2 billion. This year it may well double and account for 15 per cent of all construction!

Coming back to those materials for a moment, take a look at the **two graphs on this page which contrast the use of structural and carbon steel before Korea and now.** The square dots show how much steel was being used in an average quarter of the first half of 1950 . . . the slant-line bars (and look how they tower) show the steel required in the first quarter of this year . . . the fine dots (and look how they sag) mark steel allotments for this first quarter. As a further footnote, here are some totals: In the average quarter of early 1950, all users took 1.0 million tons of structural steel . . . this quarter they need 2.6 million and have been alloted 1.6 million, because only 1.4 million were available. In the average quarter of early 1950, all users took 16.2 million tons of carbon steel . . . this quarter they need 28.9 million and have been allotted 21.8, because only 19.4 million were available.

The picture is not altogether dark because **annual steel capacity is now about 107 million tons.** By this June it should be up 6 to 7 million more; by next December, 4 million more; and during 1953, some 2 million more, bringing the total capacity to 120 million. But things aren't rosy either, since there's **little hope for an expanded copper supply.** You can look for a lot of gloom about copper on this page as 1952 grinds along.

Speaking of plant expansion and steel capacity, look at this 210-foot blast furnace (right) under construction at the new Fairless Works of United States Steel Corp. near Morrisville, Pa. Running from a stockhouse below to the top of the furnace, the girder is being erected for the skip hoist, an incline over which material is carried to the furnace for charging. Fairless Works was 30 per cent completed by the end of 1951. C&EMonthly carried a construction story on it in the July, 1951, issue —page 75. Below are some self-explanatory graphs issued by the U. S. Department of Commerce, National Production Authority, which show the use of structural and carbon steel before Korea and now.





AASHO States Policy On F-A for Highways

At a meeting in Chicago last November, officers of the American Association of Highway Officials made a policy statement on new Federal-Aid legislation for highways. The statement was submitted to the new Congress when it convened last month.

The Association recommends the following annual F-A authorizations: interstate system, $210,000,000; primary, $270,000,000; secondary, $180,000,000; and urban, $150,000,000. The primary, secondary, and urban allocations should be distributed among the states on the 50-50 basis provided in the Federal-Aid Highway Acts of 1944, 1948, and 1950. The interstate funds should be apportioned on a 50-50 basis according to population, with no state receiving less than ¾ of 1 per cent.

Not more than 25 per cent of the amount apportioned to each state for the primary and secondary systems should be switched from one system to another, and then only if the state highway department makes such request and it is approved by the Commissioner of Public Roads as being in the public interest.

For forest highways the Association recommends the authorization of $32,000,000; forest-development roads and trails, $28,000,000; construction, improvement, and maintenance of areas administered by the National Park Service, $16,000,000; construction and maintenance of connecting parkways, $17,000,000; construction improvement, and maintenance of Indian lands, $10,000,000; roads on unappropriated lands, as delineated in the Federal-Aid Highway Act of 1950, $5,000,000.

As regards emergency relief for national disaster, a sum of $15,000,000 should be authorized for the relevant section of the present Act.

Finally, the AASHO statement provides that the foregoing recommendations be applicable for the fiscal year ending June 30, 1954, and for the fiscal year ending June 30, 1955.

Law Book for Engineers

A new book covers the basic legal problems which lie in wait for architects and engineers. Authored by Bernard Thomson and published by the Reinhold Publishing Corp., "Architectural and Engineering Law" reviews these problems, inherent in the architect's or engineer's dealings with clients, partners, contractors, and in his every-day undertakings.

The book is divided into seven major parts, and each chapter contains a brief statement of general principles followed by cases arranged according to states. This treatment of the material gives the reader a general understanding of each subject, and provides him with actual cases illustrating the application of basic principles.

The book may be obtained from the Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. The price is $7.00.

AGC President Urges Safety

In a letter to the presidents of the 118 chapters and branches of the Associated General Contractors of America, Glen W. Maxon, President of the Association, recently urged the importance of the safety program developed by the AGC Accident Prevention Committee.

Mr. Maxon stressed that the time is critical. Accident figures for the construction industry in 1950 totaled 2,300 deaths and 205,000 injuries. In construction there were 93 deaths per 100,000 workers, as compared with an average of 27 for all other industries—construction's was the poorest record but one. Construction also had a total of 8,300 injuries per 100,000 workers (the average for all industries being 3,360) and a frequency rate for disabling injuries that was double the average of all other industries. Mr. Maxon warned that, in view of the increasing tendency toward Government regulation of the nation's economy, the industry might be confronted with laws requiring the observance of hampering and costly accident-prevention methods.

Mr. Maxon urged his readers to support the program of the AGC Accident Prevention Committee, whose Chairman is H. B. Alexander, of Harrisburg, Pa. The "New Emphasis" program for accident prevention developed by this Committee is not an expense, said Mr. Maxon, but an investment that pays dividends; to follow it will remove any justification for regulatory measures by those outside the industry.

Mr. Maxon concluded his letter with an appeal to each chapter president to display an active personal interest in safety. Only in this way, he said, can a safety program become a live functioning operation.

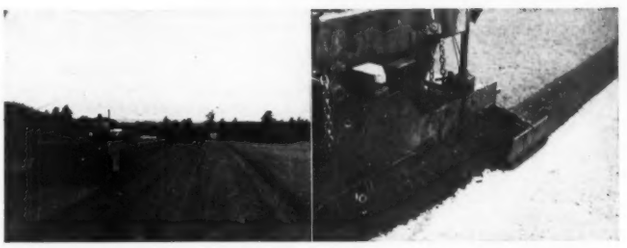
Correction

The legend for a "News and Views" photo last month referred incorrectly to a 927-foot girder being swung into place on the Hackensack River Bridge of the New Jersey Turnpike. It should have read "final section of a 927-foot girder span is swung into place" etc. Our apologies!

Where US-85 climbs over Raton Pass

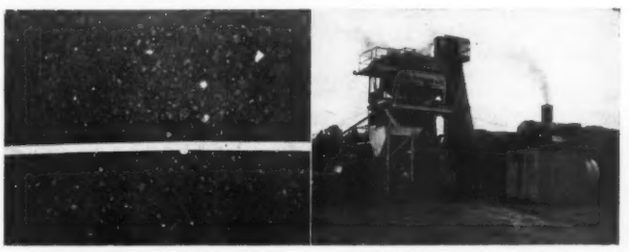
elevation 7,830 feet

Hot-mix Texaco Asphaltic Concrete being laid on U. S. Route 85 over Raton Pass in New Mexico by Henry Thygensen and Company.



Compacting 3-inch stabilized leveling course, laid over pulverized old bituminous mat.

Home-made beveling attachment used on asphalt paving machine.



Close-up of completed Texaco Asphaltic Concrete wearing surface.

The 3,000-pound asphalt batch plant used by Thygensen and Company.

U. S. Highway 85 in New Mexico crosses Raton Pass near the Colorado line a mile and a half above sea level. Last year, the state paved seven miles of this highway through the Pass. First, a 3-inch stabilized leveling course was constructed over the pulverized old bituminous mat. Then, a wearing surface of hot-mix Texaco Asphaltic Concrete, with a Marshall stability rating of 2700, was laid to a compacted thickness of two inches.

Under severe climatic conditions such as those experienced on Raton Pass, a Texaco Asphaltic Concrete pavement delivers lasting service with minimum maintenance. Its waterproof quality, low susceptibility to temperature changes and immunity to ice control chemicals make it an ideal pavement for high altitudes.

The various plant-mixed types of asphalt paving, including hot-mix Texaco Asphaltic Concrete, provide the highway engineer with answers to many of his road, street and airport construction problems. For helpful information on this class of surfaces, write our nearest office for the free booklet, "Texaco Asphalt Paving — Plant-mixed Types."

Faithfully yours 50 for Fifty Years

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TEXACO ASPHALT

Contractors and Engineers Monthly

A NATIONAL BUSINESS PAPER
For the Highway and Heavy-Construction Industry

Issued Monthly by Buttenheim-Dix Publishing Corp.
Editorial and Business Office: 470 Fourth Ave., New York 16, N. Y.

Acceptance under the Act of June 5, 1934, at Philadelphia, Pa., authorized March 26, 1945.

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How About 7½-Foot Concrete Lifts?

Should traditional 5-foot lifts on mass concrete be replaced by thicker pours, say 6½ or 7½ feet?

"Yes", say many contractors and engineers, who believe it would lower costs, speed up work, and save valuable manpower without harming the concrete. But many design engineers say "No!" And not, we might add without reason.

Both sides of the argument have merit. Labor costs have skyrocketed to the point where it costs a contractor more to prepare the flat joint on a large dam than it does to form or place the concrete. Valuable man-hours are expended in making extra lifts, running surveys, and preparing joints. The forms presently used on massive structures could certainly be extended to 7½ feet without trouble, and without the use of more critical materials. Everything points to a saving of 25 to 40 cents per cubic yard on the thicker lifts, plus fewer man-hours of exposure to accidents. It seems, too, that thicker lifts could be placed to take advantage of the concrete-cooling techniques that have recently been developed.

Right now every reasonable and acceptable procedure to minimize costs and speed up essential construction is vital. We believe that more intensive research, perhaps including several trial projects, should be carried out on the matter of thicker lifts.

Contractors are pushing at full speed to finish many large dams, so hydroelectric power can be developed. If a dam 500 feet high were built with 7½-foot pours instead of the traditional 5-foot lifts, there would be only 67 lifts compared to 100. The possible saving in labor, hours, and better scheduling of work by management which would result from thicker lifts cannot be ignored.

Are we *sure* that lifts must be limited to 5 feet? Progress comes from open-minded study and experiment. We need more research on this subject.

Good Will Through Good Signs

Public relations—good or bad—are created by many things. One of them, certainly, is the manner in which a firm or organization deals directly with the public.

Take the matter of caution or detour signs on road jobs, for instance. All too often such signs are curt and peremptory, if not downright discourteous, when they can just as well issue their warning in a friendly pleasant fashion, engendering *good* will instead of annoyance on the part of the public. And such signs can be just as effective too. There's a perversity in human nature which makes us resent and rebel against "orders", when we don't object at all to acceding to a courteous request.

Road-job signs can do even more; they can serve to inform the public about the work under way—what the project is and why. Everyone wants more and better highways, but many people give very little thought to what's involved in getting them—the money, the planning, the time required to build a new, modern, safe, transportation facility. Every contact the public has with road work should be used to enhance its knowledge and understanding of the highway situation.

On this page we have reproduced some road-job signs which exemplify these points. One, erected by a highway department, courteously explains to the public the reasons for the project and the temporary inconvenience it causes. The others, a series put up by a contractor, use the light touch to give the necessary warnings. Both help to create good will and understanding.

Contractors and highway departments alike will do well to give more thought to the signs they erect, for they can contribute much to good public relations, public understanding, and public support of the highway program.

Time to Stress a Basic Obligation

Nationwide tribute will be extended this month to the engineering profession. Under the sponsorship of the National Society of Professional Engineers, February 17 through 23 has been declared Engineers' Week to direct attention to the members of the profession and their accomplishments.

The celebration will also afford engineers a special opportunity to re-evaluate their responsibilities to society.

Looking back on a year riddled with rackets, graft, and corruption, we are reminded of one basic responsibility which needs not re-evaluation but re-emphasis. That responsibility is integrity.

Every day the expanding role of the engineer brings him into closer contact with government. More and more he is exerting a strong influence on our industrial society. Whether he welcomes it or not, the engineer is now being given partial responsibility for controlling and leading the forces that his technical progress has set in motion.

In the present state of the world this is a grave responsibility. Preserving the lofty ideals of his profession should be the engineer's first and basic responsibility. He must continue to be guided by the highest principles of honor as he deals with clients, fellow engineers, and the public. These principles are best summed up in the final passage of the American Association of Engineers' Vow of Service: "To place service before profit, the honor and standing of the profession before personal advantage, and the public welfare above all other considerations."

Three Million Tons a Month

Of what? Scrap. That is the amount needed to support steel production at capacity, according to Charles E. Wilson, Director of Defense Mobilization. In his fourth quarterly report, entitled "The Battle for Production", Mr. Wilson goes straight to the point. The 3,000,000 monthly level was not met in 1951, but in 1950 it was exceeded, which shows it's a feasible goal for 1952.

Located strategically about the country are 1,200 scrap-mobilization committees, all busy organizing the flow of scrap from industrial plants and business establishments into the steel mills. An order issued in December to auto-wrecking yards was expected to flush out about 2,000,000 tons of scrap during the lean winter months. What about your yards? Are they clear of scrap? Have you helped toward the goal?

Bars Employee Fee in Hiring

A campaign waged by the Construction Men's Association, Inc., New York, N. Y., came to a successful conclusion on December 5, 1951, when the Army Corps of Engineers issued a directive. The directive forbids contractors on projects financed by U. S. Government funds to hire workers through employment agencies where a fee is charged to the employees.

American construction companies performing Government-fund jobs were formerly free to obtain their workers in any way they wished, but the Association had been protesting for years that such jobs could only be obtained by paying exorbitant fees to a handful of favored employment agencies centered in New York and California. The Association's demand that Government-force contractors do their hiring through the charge-free U. S. Employment Service is now met by the statement in the directive that "In the future, it shall be the policy of the fixed-fee contractors to avoid the use of private employment agencies where a fee is charged to the employees. The use of any such private agency is expressly prohibited until all other sources of supply have been exhausted."

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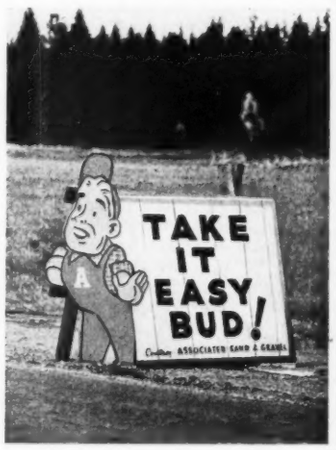
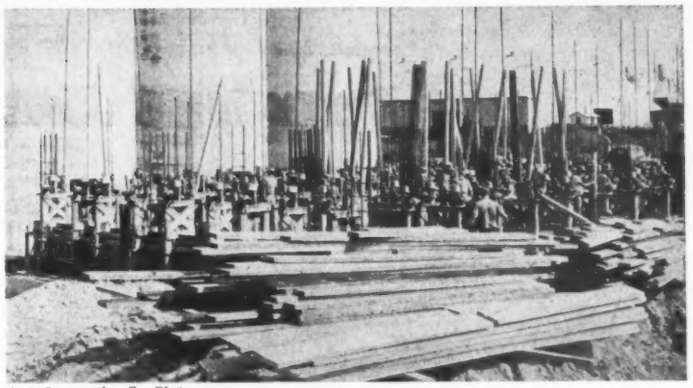


It's our guess that the contractor who erected the friendly road signs pictured at right earned himself a lot of public good will as well as cheerful compliance with his warnings. The Maryland State Roads Commission, too, knows how to win public good will and support for its road program with the courteous sign pictured below. (That's Governor McKeldin adding a touch of authenticity to his signature.)

New Grain Elevator And Dock for Mobile

Jack Construction Co. Handles Both Contracts at the Port; Slip Forms Used for Head House and 42 Tanks



Jack Construction Co. Photo

Against a battery of completed silos in the background, slip forms are in place for the next battery, during construction of the Mobile, Ala., grain elevator.

• A NEW grain elevator and dock were added to the port facilities of Mobile, Ala., last year. The Alabama Grain Elevator Co. sponsored the $2,000,000 grain elevator, consisting of head house and 42 tanks, while the Alabama Department of State Docks and Terminals financed the $452,000 dock. Both the private and the public works projects were built by the Jack Construction Co. of Kansas City, Kans. The waterfront improvement got under way in January, 1951, and was completed by the end of the year.

The Jack Construction Co. first obtained the contract for the concrete grain elevator, a type of building usually employing the slip-form method of construction in which the Kansas contractor particularly specialized. This elevator was to be located along a new state dock—Pier D South—to be built at the same time. Since part of the foundation for the dock extended under the site of the grain elevator, Jack Construction Co. was concerned with the problems that would undoubtedly arise with two contracting firms trying to work in the same area. Such difficulties were set aside when the Jack Construction Co. also bid successfully for the dock work.

Located north of the city in the sprawling State Docks and Terminals area along the Mobile River, the project lies on the north side of a slip running east and west, with the outlet to the river at the east end. New Pier D South includes a concrete deck 540 feet long x 20 feet wide. Along its front or water edge is a steel-sheet-pile bulkhead extending beyond the ends of the concrete dock for a total length of 666 feet. The line of the steel sheeting is continued with a timber dock on each side—539 feet to the east, and 297 feet to the west.

Modern Grain Elevator

The tallest part of this first modern grain elevator to be built in Mobile is the 215-foot-high head house which contains on its multiple stories the operating machinery for handling the grain—also 44 separate storage bins. The warehouse pit, a single-story structure, adjoins the head house on the west. To the east are the 42 tanks or silos, 115 feet high, which are used as bulk-storage bins. They have an inside diameter of 21 feet, and are grouped into two batteries of 21 tanks each, battery A adjoining the head house, and battery B at the east end of the elevator structure. Batteries are laid out in three rows of 7 tanks each. Thus there are 14 tanks along the length of the pier by 3 deep.

Tanks are laid out with their circular sides touching each other. The space enclosed between four tanks is in the shape of a 4-point star, and also serves as a storage bin. Of reinforced-concrete construction throughout, 3,000-psi at 28 days, the interior tank walls are 6 inches thick, while the walls with the outside facing are 6½ inches. In the head house the walls are generally 6 and 7 inches.

The foundation footing for the elevator consists of a huge RC slab 312 feet long x 73 feet 5½ inches wide under the tanks or silos, and 51 feet x 73 feet 5½ inches under the head house. The top of the 3-foot-thick tank footing is at plus 5 elevation, while the 3½-foot head-house footing has a top elevation of minus 19. Under the silo footing are 2,800 untreated-timber piles averaging 44 feet in length with 8-inch tips and 12-inch butts. They were driven to 25-ton bearing, spaced 3 feet 2 inches on centers in an east-west direction, and 2 feet 6 inches north and south. They are embedded 4 inches in the concrete footing.

Dock Contract

The 20-foot-wide x 3-foot-thick RC deck for Pier D South is supported on 2-pile bents of 18-inch-square RC precast piles, 60 to 65 feet in length. The steel-sheet-pile bulkhead consists of MZ-38 sections, 50 to 60 feet long, capped by an 18-inch 42.7-pound channel. To prevent any movement of the bulkhead, tie rods go back from the sheeting to steel H-pile anchor bents located 68 feet 3 inches behind the wall. Anchor bents contain three H-piles, 12-inch 53-pound sections 60 feet long.

(Continued on next page)

Another Goodyear

EYE-OPENER

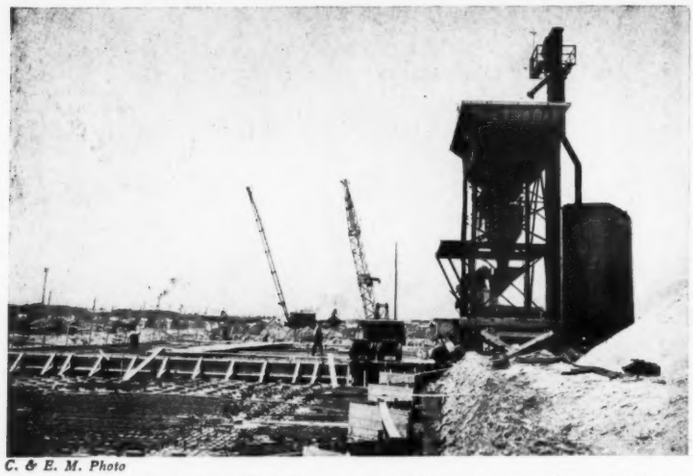
—in the public interest—and yours!

To help you help America get the *modern* highway system we all need so desperately, here is another in Goodyear's precedent-setting series of two-page, full-color advertisements in multimillion circulation news magazines.

Another reason why it pays always to BUY and SPECIFY

GOODYEAR

THE GREATEST NAME IN RUBBER



C. & E. M. Photo

All is set for the first concrete pour on the Mobile, Ala., grain-elevator footing. At the right is a Johnson batch plant and in the background Northwest (left) and Lorain cranes excavate for the head-house foundation. Jack Construction Co. of Kansas City, Kans., was the contractor on the project.

C. & E. M. Photo

In this closeup of the head-house sheet-steel-pile cofferdam, a Blaw-Knox ½-yard clamshell bucket on a Lorain crane comes through between the bracing. In the foreground, a Sterling 4-inch pump removes surface water from a hole that is being dewatered by a Moretrench wellpoint system.

New Grain Elevator And Dock for Mobile

(Continued from preceding page)

One pile is plumb, while the other two are battered 3 on 12 in the direction of the bulkhead.

Where the grain elevator is behind a portion of the bulkhead, the anchor bents lie within the footing—22 feet 6½ inches inside the rear or north line. The steel piles were driven between the rows of timber foundation piles, and in these areas the depth of the concrete footing was increased from 3 to 4 feet. In driving the two different types of piles in the same area, the single contractor was able to coordinate the work better than would have been possible had two firms been engaged. Altogether 80 H-piles were driven within the area of the footing.

Tie rods go through the bulkhead at minus 3 elevation; top of dock is at plus 11. Outside the footing the ties are 3-inch-round rods equipped with turnbuckles, and spaced on 11-foot centers. Within the footing where they are covered with concrete, the ties are 1-inch-square bars threaded at the outer end for a connection to 1¼-inch-round bars that enter the bulkhead.

(Continued on next page)

The Wonder Grease for Concrete Forms

REGARDLESS of whether you use steel or wooden forms for concrete work — you can apply Globe Form Grease by spray, brush, or swab. This time-tested paste emulsion will reduce peeling and pitting to a minimum when forms are removed, and practically eliminate patching.

Due to its special adhering qualities, Globe Form Grease requires only a thin coating for utmost effectiveness. In fact, one gallon adequately covers approximately 200 square feet! And in addition — Globe Form is stainless, leaves a whiter smoother surface, and eliminates the need for painting.

Why not write for full particulars today? Once you use Globe Form Grease, you'll understand why engineers and contractors hail it as the "wonder grease" for concrete forms.

OILS and GREASES for every purpose
DIESEL
STEAM
AUTOMOTIVE
Write for descriptive booklet of all Borne, Scrymser products.

BORNE SCRYMSER Since 1874

Our Laboratory Facilities are always at your disposal

BORNE, SCRYMSER COMPANY ELIZABETH, N. J. • CHARLOTTE, N. C.

STEEL SHEET PILING

CANCER CAN STRIKE ANYONE!

Give and keep giving to conquer cancer. Send your contributions to: "CANCER" care of your local Post Office

Any necessary adjustments or taking up were made at the threaded connection. Ties are on 18-inch centers.

Pile Driving

Overgrown with cane weed, the site for the grain elevator was excavated to an average depth of 6 feet in three days with three tractor-dozers—Caterpillars D8 and D7, and an International TD-18. The sand and silt dozed out of the hole served to level off the surrounding area, or was used for backfill behind the bulkhead wall. When the silo area was down to grade, the timber foundation piles were driven under a subcontract by the Ernest Construction Co. of Mobile. Two rigs were used—a Lorain 1¾-yard crane with a 70-foot boom and a Vulcan 50C hammer, and a shop-made steam revolving crane equipped with a 75-foot boom and a Vulcan No. 1 hammer. The latter unit operated from a timber cribbing. Also on hand for unloading and material handling was a Northwest ¾-yard machine with a 65-foot boom. Steel H-piles for the anchor bents were driven by McKiernan-Terry 9-B-3 hammers. Swinging steel leads, 60 feet long for the timber and 70 feet for the steel H-sections, were used in the driving.

A steel-sheet-pile cofferdam, 26 x 80 feet, also was driven to contain part of the head-house foundation. This particular area went down to minus 23 elevation, so 30-foot lengths of sheeting were employed. Three rings of 12 x 12 wales spaced vertically 11 feet on centers, supported the sides of the cofferdam. They were cross-braced with struts cut from timber piles and spotted on 7-foot 6-inch centers.

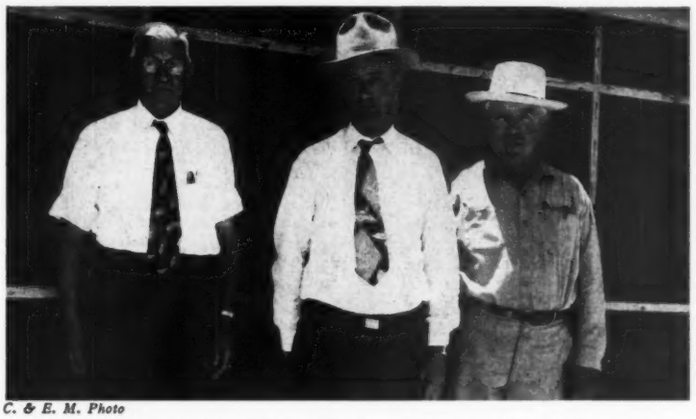
Excavation within the cofferdam was handled by the Lorain crane using a Blaw-Knox ½-yard clamshell bucket and the Northwest rig equipped with an Owen ¾-yard clamshell. When minus 12 elevation was reached, two rows of timber piles were driven just inside the cofferdam to increase the stability at the bottom of the sheeting. The remaining center foundation piles were driven when the excavation was completed. All driving at the cofferdam, both timber and steel sheeting, was done with the Lorain rig and the 9-B-3 pile hammer.

Wellpoint System Required

Steel sheeting and H-piles for the project were obtained from the Tennessee Coal & Iron Co. at Birmingham, Ala., while the timber piles were procured locally. After the latter were driven they were cut off to grade with a Mall chain saw.

Because of the depth of the cofferdam (deeper than any previously attempted along the Mobile waterfront), and its proximity to the river, a wellpoint system was required to dewater the area during its construction. A Moretrench system was installed with 100 points outside the cofferdam that went down to minus 26 elevation. Within the cofferdam, additional points were put in as the excavation progressed in order to reach the minus 40 level. Grade at the bottom of the adjoining slip is minus 35.

Three Moretrench 8-inch pumps were hooked up with the wellpoints through an 8-inch manifold. One of these served the upper-stage layout, while the other two pumps, set up on a platform within the cofferdam, were connected to the deeper system. Surface water was removed from the hole by a Sterling 4-inch pump.



C. & E. M. Photo

Men on the job at Mobile—left to right: Henry Hiden, Resident Engineer for the Alabama Grain Elevator Co.; L. H. Jefferson, Vice President of Jack Construction Co.; and George Black, Superintendent for the contractor.

Concrete Plant

While these operations were in progress, the contractor had erected a Johnson concrete batch plant midway along the length of the silo footing and just off the north side. It consisted of a 135-ton aggregate bin, divided into three compartments, and an adjoining 400-barrel bulk-cement silo. Beneath the weighing bin under the aggregate compartments was a Smith 1-yard mixer. City water was hooked up to the mixer through a 2-inch line.

Ideal Co. cement from a mill only a few hundred feet away in the Terminal area was transferred to the cement silo from railroad cars. Sand and gravel came from the Richland Sand & Gravel Co. of Richland, Miss., via the tracks of the Gulf, Mobile & Ohio Railroad and the Terminal siding. Material was stockpiled at the sides of the plant, and one of the cranes charged the bins. The concrete was air-entrained with Darex, added at the mixer.

This setup was used for placing con-

(Continued on next page)

BORINGS & ROCK HOLES
Test Borings, Diamond and Shot Drilling, Inclined Holes, Calyx Drilling for Foundations, Elevators, etc.
GILES DRILLING CORPORATION
2 Park Avenue
Dept. C New York 16, N. Y.
Tel: LExington 2-6834

Side-Step Trouble with these three "NO'S" in BARNES "33,000 for 1" PUMPS

NO SOFT SPOTS TO WEAR ON WATER SEAL

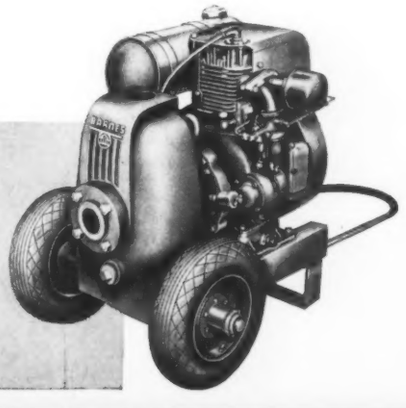
The two wearing parts on the Barnes Super Seal are hardened steel. You have steel on steel. There are no soft spots to wear. Since the grease seal is automatically lubricated, pump can be run dry without damage to either pump or seal.

NO RE-CIRCULATING CHAMBER TO CLOG

Barnes "33,000 for 1" Pumps do not have either a re-circulating chamber or port. Cement-water, stones, twigs, leaves and such will not clog the pump.

NO COSTLY REPAIRS TO KEEP PUMP VOLUME UP

Simple impeller adjustment takes up wear of impeller. It is simple and inexpensive to restore pump to its original capacity and performance of high vacuum readings of 25" of mercury and 27 to 28 foot-lift of water.



FOUNDED 1895 Barnes MANUFACTURING CO. MANSFIELD, OHIO

Complete Line From 4,000 to 90,000 G.P.H. Choice of Electric, Diesel, Gasoline, or Pulley Drive.

BUY THE BEST • • • BUY BARNES

New Grain Elevator And Dock for Mobile

(Continued from preceding page)

crete in the foundation slabs, the 42 tanks, and warehouse pit. Another plant was also erected for furnishing concrete in the head-house construction, and as a standby. It consisted of a Winslow batch bin and scales, and a CMC 16-S concrete mixer. Two timber towers were built to raise the concrete for the high structures—a 165-foot tower for the tanks, and a 265-foot tower for the head house.

Pouring the Slabs

Concrete placing for the foundation slabs was a big job, but was done in the conventional manner. The slab for battery B, the easterly half, was done first in a continuous pour; it took four days to complete the 2,000 yards. Reinforcing was furnished by the Ceco Steel Co. of Birmingham, Ala., and a pair of P&H welding machines were on hand for welding some of the long bars together. As the concrete was mixed it discharged into a 1½-yard deck hopper, and from there was transported to the wooden forms in a fleet of eight Grace rubber-tired buggies. In placing, it was vibrated with Viber machines. The slab was cured with a layer of sand that was kept continually wet. Battery A and the head-house foundations followed in order.

Because of a shortage of reinforcing steel, the concrete in the foundation slab was not carried on out to the bulkhead. The reinforcing rods projected through the forms on the slip side, and were bonded to the deck steel when the pier pours were made later in the year. In the meantime formwork was going ahead for the tanks and head house. The tanks were poured in batteries of 21 at a time.

The special slip forms were built right on the job, with two Beach 10-inch table saws set up to speed the cutting of lumber. The forms were 4 feet high, consisting of vertical 1 x 4 center-match lumber, held in place by two horizontal wales made up in chords of laminated 1-inch and 2-inch stock. Tank forms were unlined, but the forms for the head house were lined with 12-gage metal.

Special Jacks

Straddling the inner and outer forms across the wall being poured were heavy timber yokes placed 7½ feet apart and connected to the forms. Through these yokes went 1-inch steel jacking rods connected to the special Double J jacks which the contractor has developed and patented. In pouring a battery of 21 tanks or silos, 200 of these jacks were used; the head-house construction required 140 jacks. By means of these jacks the slip forms were slowly raised as the concrete was placed. An average 16-foot lift of wall, in each silo making up the battery, was completed each day in a continuous 24-hour pouring operation.

The jacks are operated by electric motors, and are automatically self-leveling as they slowly climb upward as though pulling themselves by their bootstraps. In their case they grip the jacking rods which are left embedded in the concrete as the pours go up. Raised with the form, of which it was a part, was a timber working platform from which the concrete was placed and the jacks were operated. Suspended from the forms all around the sides was a platform scaffold from which the cement finishers smoothed off the surface of the concrete while it was still only a few hours old. Since the concrete was still in the plastic state, a surface of excellent texture and uniformity was obtained.

The outer wall form was held in a precise vertical plane, but the inner slip form was battered slightly so that it would slide easily. All walls were reinforced with circular hoops made of ⅝-inch-diameter steel wire. At the bottom of the silos the hoops were spaced on 8-inch centers, but this spacing was reduced as the height of the walls increased. No vertical reinforcing was placed in the interior walls.

From the mixing plants the concrete was discharged into a skip at the foot of the towers. The skip was raised by a Clyde 2-drum hoist to the level of the working platform where it emptied into a hopper. Buggies were filled beneath the hopper and the concrete was distributed around to the forms.

Quantities and Personnel

Once concreting had started with the slip forms, the pouring was a continuous operation until the structure was finished. Light for the night work was furnished by 12 clusters of G-E sealbeam electric lights, with 6 lamps to a cluster. They were placed at the concrete plants, on the concrete towers, and around the working platform near the jacks. This working platform became the form for the roof slab when the top of the tanks was reached. While the job was highly mechanized, the working force was increased from around 60 on the pile driving and form construction to nearly 500 when three shifts were busy placing concrete.

For the grain elevator there were three major material items:

Concrete	17,000 cu. yds.
Reinforcing steel	1,000 tons
Untreated-timber piling	150,000 lin. ft.

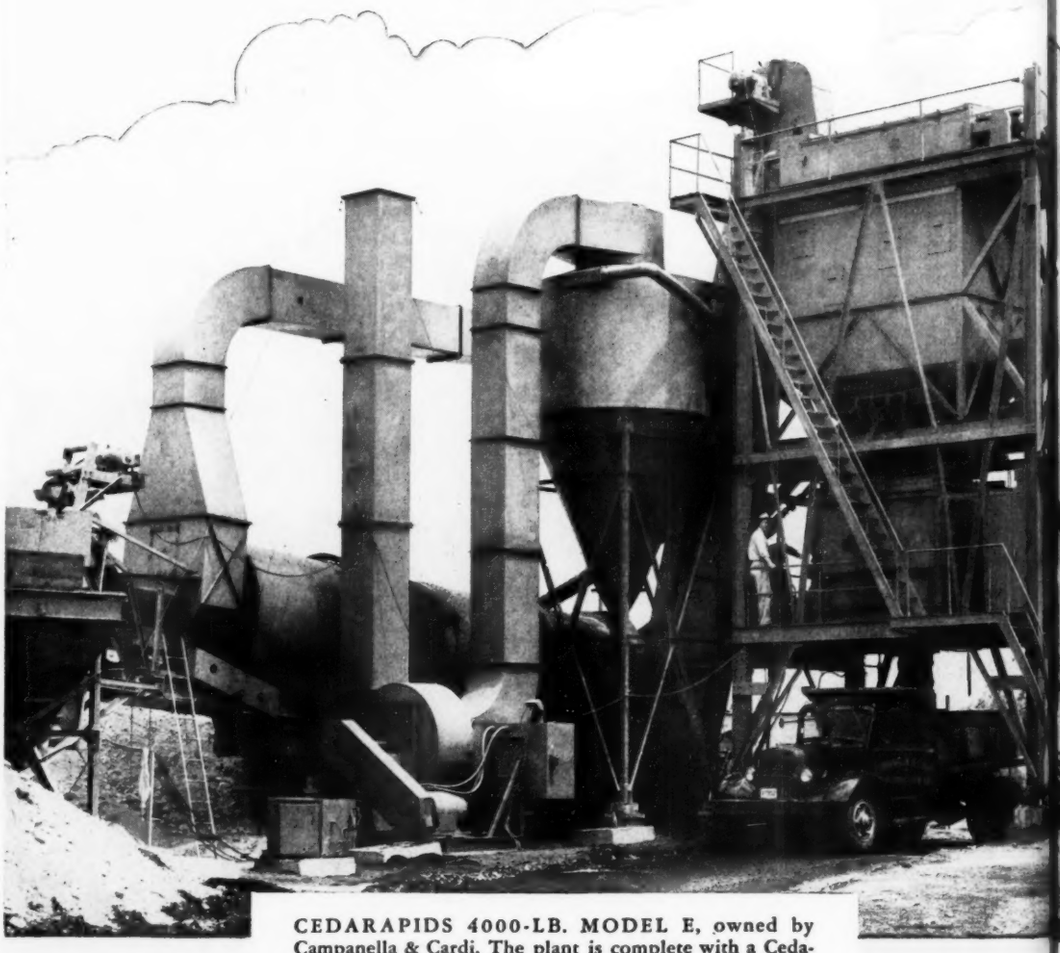
Major items for the dock included:

Concrete	1,000 cu. yds.
Precast-concrete piles	3,000 lin. ft.
Reinforcing steel	95 tons
Structural steel	85 tons
H-piles, 12-inch	15,000 lin. ft.
MZ-38 sheet piling	693 tons
Treated-timber piles	44,000 lin. ft.
Treated timber	66,000 MBM

In addition to the contract items, the State Docks and Terminals will install tracks and yard facilities. The Alabama Grain Co. will install a Kewanee dumper at the rear of the grain elevator. The Frisco and Gulf, Mobile & Ohio Lines will haul grain for export to the elevator from Kansas, Oklahoma, and other western states. The slip in front of the pier will be dredged by the Standard Dredging Co. under a separate contract.

(Concluded on next page)

"WE CAN BID LOW ON



CEDARAPIDS 4000-LB. MODEL E, owned by Campanella & Cardi. The plant is complete with a Cedarapids drier, charging hopper and feeder, and a 10′ cyclone type dust collector with dust scavenger and dust elevator.

THE IOWA LINE *of Material Handling Equipment Includes:* ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • PORTABLE POWER CONVEYORS • PORTABLE AND STATIONARY STONE, GRAVEL AND SAND PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • DRIERS • DUST COLLECTORS • HAMMERMILLS • WASHING PLANTS • VIBRATING SOIL COMPACTION UNITS • DOUBLE IMPELLER IMPACT BREAKERS

Nelson, Beggs & Eidson of Kansas City, Mo., was consulting engineer on the design of the grain elevator for the Alabama Grain Elevator Co. of Mobile.

Trotter Ernest Engineering Co., Inc., of Mobile was consultant on the dock design for the Alabama State Docks and Terminals.

Key personnel for the contractor, Jack Construction Co., Inc., included L. H. Jefferson, Vice President; George Black, Superintendent; and C. E. Overmyer, Assistant Superintendent.

Henry Hiden was Resident Engineer for the Alabama Grain Elevator Co., and A. L. Horton was Inspector for Trotter Ernest Engineering Co., Inc. Clark U. Irvine is Chief Engineer for the Alabama State Docks and Terminals.

Better Engine Maintenance

The importance of good engine maintenance is told in a new and interesting cartoon story booklet issued by Caterpillar Tractor Co., Peoria, Ill. Presented in four colors on 28 pages, it follows a dealer's serviceman as he shows job mechanics how good maintenance adds hours to engine performance.

The material applies to the smaller Caterpillar diesel, marine, and electrical units. Full discussion is given to cooling, lubricating, air-intake and exhaust, and fuel-supply systems. The booklet also covers the care of starting engines, marine gear and generators, and cold-weather hints.

Copies of the booklet may be obtained from the company, or use the Request Card at page 16. Circle No. 519.

Engineering Services

The engineering services offered by York Engineering & Construction Co., 951 Penn Ave., Pittsburgh 22, Pa., are described in a 4-page folder. They include the design of buildings, foundations, and equipment for industrial plants. The company will also direct project coordination and control. Brief data are given on the staff principals in the firm and previous work performed.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 449.

Alaska Seeks Bids

Additional information on the Army Engineers 1952-53 construction program in Alaska is now available (for previous reports, see C&E Monthly, November, pg. 93, and December, pg. 39). The latest details concern defense construction comprising some 96 new jobs at an estimated cost of $170,000,000. The Prospectus of Construction which was recently published lists some of these projects and emphasizes that contracts will be awarded on the basis of open competitive bidding. Any firm which so desires may receive the formal Notice to Prospective Bidders detailing proposals and requirements as they are scheduled.

Colonel Lyle E. Seeman, the Alaska District Engineer, Corps of Engineers, U. S. Army, invites contractor consideration of a program which includes the following scheduled projects for the 1952-53 season: vehicle repair shops, gasoline stations, administration buildings, warm-storage units, Post Engineer facilities, telephone exchanges, indoor training facilities, refrigerated warehouses, maintenance shops, a bakery, port facilities, a laundry and dry-cleaning plant, ammunition storage, a hospital, water and sewage-treatment plants, theaters, ordnance and artillery shops, an Arctic training school, commissaries, a locomotive shop, a cold-storage plant, barracks, bachelor quarters, family housing, central power and heating plants, bulk liquid-fuel systems, utilities (including water, sewer, steam, and electric lines), communication systems, fire stations, and many others.

During 1951, 114 contracts were let at a total cost of $190,000,000, and there is currently under contract about $250,000,000 worth of construction, designs, and services. In general, the system used in Alaska for the development of plans involves the combination of design by the on-the-site Corps of Engineers' staff with that of the architect-engineer. The local Alaska District Engineer staff, working closely with the various Command staffs, determines from first-hand knowledge just what is to go into the form of definitive line drawings and general criteria.

Facilities for contractors include some 1,500 pieces of Government-owned standard construction equipment; housing and messing at the large centers; year-around docking at Seward and from April to November at Anchorage; local commercial plants and materials, but with limited stock on hand; and water, air, railroad, and truck transportation. Specifications for all work is in four parts: (1) a brief description of the job in general; (2) outline of general conditions normal for construction under Government contracts; (3) special conditions for the particular job; (4) technical specifications. Government finance facilities are adequate to assure prompt payment of partial-payment estimates. Partial payments are made as the work progresses at the end of each calendar month or as soon thereafter as is practicable.

Full details of current and programed projects appear in the 1952-1953 Prospectus of Construction. The prospectus is available on request from Gil Pearson, Technical Information Officer, Office of the District Engineer, Alaska District, Anchorage, Alaska.

U. S. Plywood Mgr., Fresno

George W. Allen has taken over the management of the Fresno, Calif., sales and distribution branch of U. S. Plywood Corp., New York, N. Y. He succeeds the late John D. Patriquin. Mr. Allen joined the company in 1938 and has served in three other California branches. Prior to his new appointment he was a member of the sales staff in Oakland.

AIRPORT SURFACING PROJECTS... *that's why we buy* CEDARAPIDS"

says Campanella & Cardi
Construction Company
Hills Grove, Rhode Island

HERE'S another contractor who is 100% sold on Cedarapids equipment and the Cedarapids advantages that permit low bids on black top surfacing jobs. Campanella & Cardi are supplying bituminous concrete for the Limestone Air Force Base at Limestone, Maine, using two Cedarapids Asphalt Plants...a 4000-lb. Model E and a Model FA. Their two-year contract calls for production of 150,000 tons for the Base, and with their Model E averaging 125 tons per hour under the direction of Joe Papitto, Superintendent, *the job is now half done and ahead of schedule,* with 75,000 tons already produced!

No wonder so many low-bidding contractors buy Cedarapids!

Check these
money-saving features of
CEDARAPIDS
Bituminous Mixing Plants

- High capacity 88" x 28' drier allows operation at full capacity regardless of whether or not aggregate contains a high percentage of moisture.
- Use of multiple burner type pressure air atomizers results in extremely low fuel oil consumption.
- Because all mixing takes place below the center line of the pugmill shafts, a completely coated mix can be obtained in 10 to 15 seconds.
- Built-in portability, rugged construction and fast operating controls result in less downtime. Combined with a faster mixing cycle, these features mean lower costs per ton.
- Central operator's panel, air controls, signal lights, interlocking time controls, complete portability, self-erecting tower and rapid set-up are a few of the Cedarapids features that insure ease of operation with absolute accuracy of mix to speed production and make possible LOW BIDS.

CEDARAPIDS MODEL FA, also used on the Limestone job. In addition, Campanella & Cardi have a 3000-lb. Model E Plant, purchased in 1945, which is still producing.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

A Tailgate Spreader For Calcium Chloride

A new spreader for installation on any size of dump truck is manufactured by The Baughman Mfg. Co., Shipley Road, Jerseyville, Ill. Developed by The Dow Chemical Co. after two years' research, it is designed for applying calcium-chloride pellets and flake to roads for dustproofing and ice control.

The tailgate spreader weighs 380 pounds and can be clamped in place with a load binder in about 30 minutes. The spreader roll is so constructed that no material can leak through when the spreader is shut off, even though the truck bed is raised. Uniformity of spread is achieved by driving the spreader roll through an easily installed linkage with the wheel of the truck. As the truck speed increases or decreases, the spreader roll goes faster or slower and delivers the same number of pounds of material per square yard. The company states that the spreader roll delivers calcium chloride to the road without undue force, which would tend to scatter the material off the road. The operator of the truck controls the whole operation from the cab. A clutch lever by the left-hand door starts or stops the spreader roll and the hopper is kept full by gradually raising the truck bed.

Dow Chemical developed and The Baughman Mfg. Co. is making this tailgate spreader for calcium chloride. It fits any size of dump truck and features uniformity of spread, light weight, and easy installation.

Another feature is a 2-speed oil-sealed drive with which the operator can double the rate of application, where extra material is required on hills and curves, merely by shifting a gear. A wide variation in application rates is made possible by driving the unit through a series of chains and sprockets. Use of the proper-sized sprockets will give application rates from ⅛ to 2 pounds per square yard. Intermediate rates possible with standard-size sprockets are ¼, ½, and one pound per square yard.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 453.

Difficult Foundation Work

A 12-page booklet has been issued which outlines the scope and variety of construction and engineering work undertaken by Spencer, White & Prentis, Inc., 10 E. 40th St., New York 16, N. Y. It describes and illustrates the company's work on foundations, sheeting and bracing, shoring, underpinning, moving structures, cofferdams, piling, and special services. Job photographs and specific details on projects heighten the interest of the booklet.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 432.

New Huber District Mgr.

Don McPherson is District Sales Manager in the northeastern district for Huber Mfg. Co., Marion, Ohio, manufacturer of road maintenance equipment. The territory includes all of the New England states, Maryland, New Jersey, New York, Pennsylvania, and Virginia.

Mr. McPherson, who will make his headquarters for the present at Huber's home office in Marion, has been associated with the company since 1942. Prior to his new appointment he was Assistant District Sales Manager in the southern states.

MIXERMOBILE MANUFACTURERS

completely Portable CONCRETE
- WEIGH BATCHING
- MIXING
- ELEVATING

PLANT

CAPACITY UP TO 50 CU. YDS. PER HOUR

FROM RAW MATERIALS TO POURED CONCRETE

This ruggedly built trio means more jobs covered...reduced labor costs...savings in time and expense of making stationary installations. All functions are performed by one operator on each unit. Completely portable equipment travels at normal highway speeds...setup time for complete operation is 15 minutes or less.

MIXERMOBILE Weigh Batcher — Model WB-3

Completely portable unit weigh batches aggregate on the job. Can be charged with front end loader from storage piles or directly from dump trucks. Single operator sets up unit for operation in 15 minutes. Weigh batches up to 50 cu. yds. per hour.

- Three 7 cu. yd. bins and 2 cu. yd. skip store up to 23 cu. yds. of aggregate.
- Charging skip hydraulically operated.
- Bin selector located by skip control directs skip.
- Equipped with either dial or beam scales.
- Weight, 17,800 lbs; height, 12 ft.; width, 8 ft.; overall length, 28 ft. (with skip down).
- Mounted all around on 8.25x20 tires.

5-YD. MIXERMOBILE — Model M-5

Completely mobile concrete mixing and elevating plant eliminates cost of hauling and erecting expensive equipment. One man handles the entire operation from mixer to deck.

- Improved batch-timer and counter insures positive mixing time.
- New electronic water meter gives unerring accuracy.
- Sturdy planetary drive hoist clutches give extra power, durability.
- Mixes up to 50 cu. yds. per hour.

SCOOPMOBILE — Model C

The versatile Scoopmobile with exclusive planetary drive has 7 "quick change" attachments. Standard ¾-cu. yd. scoop bucket permits operator to keep Weigh Batcher unit performing to full capacity.

- Loads and transports aggregate.
- Transports, elevates and pours concrete.
- Lifts and places form panels, timbers, etc., up to 4,000 lbs. capacity.

ATTACHMENTS INCLUDE: Scoop buckets in various sizes, swivel and standard type concrete hoppers in ¾ cu. yd. capacities, lift forks, crane boom, track extensions with braces up to 26 feet overall.

Write for literature and address of your nearest dealer.

Mixermobile Manufacturers reserve the right to make improvements in design and specifications without notice.

MIXERMOBILE MANUFACTURERS

WAGNERMOBILE

Box 7527 • Portland 20, Oregon

SQUARE AND HEX HEAD

MACHINE BOLTS

LARGE QUANTITIES OF 5/8 AND LARGER DIAMETERS ARE BEING ADDED TO OUR STOCK FOR

Immediate Shipment

FAST SERVICE ON ANY QUANTITY — We manufacture and stock fasteners of every type in all materials — Two factories and five warehouses to serve you.

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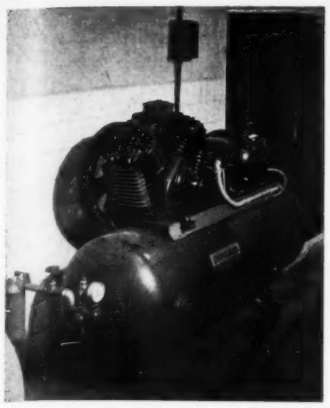
STRONGHOLD SCREW PRODUCTS

CLEVELAND
NEW YORK
ATLANTA
DOWNEY (Los Angeles)



This 5-hp DeVilbiss air compressor furnishes air for spray painting. A new 3-hp model is also on the market.

New Air Compressors

Air compressors in 3 and 5-hp sizes have been announced by DeVilbiss Co., Toledo, Ohio. They are V-type 4-cylinder two-stage units and supplement the company's line of 7½, 10, and 15-hp compressors. All sizes are available for either 125 or 175-pound pressure service. The company recommends pressures ranging from 100 to 125 pounds for industrial use or spray painting, and 140 to 175 pounds in garage service for operating lifts and other air-using tools and devices.

Heat that is generated is said to be rapidly dissipated by finned cylinder heads, blocks, intercoolers, and check valve, aided by a fan-type flywheel. All operating parts are counterbalanced and designed to prevent vibration and give a smooth and quiet-running compressor. All outfits are equipped with automatic pressure switches to start the motor when pressure drops, and stop the motor when the desired maximum pressure has been reached. ASME air receivers and high-starting-torque electric motors are standard on all sizes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 489.

Improved Lift Trucks

Improvements on the Model 20 lift truck have been announced by the Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg. The unit has new upright assemblies and load-arm pins which permit use of optional additional counterweight on the standard 2,000-pound-capacity model; thus the owner can increase or decrease load centers or load capacities as he needs to. The optional counterweights bolt to the rear of the machines with 8 cap screws.

The three basic variations on the standard unit make possible at least 6 different combinations of the same model truck, Hyster says. The fact that the counterweight can be removed when it isn't needed, as for ordinary light-capacity jobs, results in fuel and maintenance economy and saves unnecessary wear and tear.

Further information may be secured from the company. Or use the Request Card at page 166. Circle No. 525.

Steel Bridge Grating

A comprehensive folder on steel bridge flooring is available from Kerlow Steel Bridge Flooring Co., 222 Culver Ave., Jersey City 5, N. J. Laid either longitudinally or transversely on a bridge, the flooring will carry H-20 loading up to a span of 48 inches and weighs approximately 19 pounds per square foot. A special red paint is used on it.

With the transverse-type grating, the bars that the tires ride on are placed higher than the longitudinal bars, and are serrated to provide greater traction for emergency stopping.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 521.

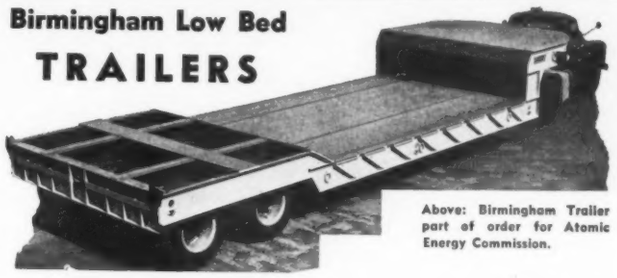
Charles F. Smith Dies

Charles F. Smith, President of the Smith Engineering Works, Milwaukee, Wis., died on December 10, 1951, at the age of 70.

Mr. Smith had been head of his firm for more than 35 years and was an outstanding figure in the development and manufacture of machinery for mines, quarries, and gravel pits. During the years of his administration, he raised his company from a small firm owning few patents and building only a gyratory crusher and some other related equipment, to its present stature in the industry. As well as being President of the Smith Engineering Works, Mr. Smith was at the time of his death a vice president of the Sterling Wheelbarrow Co., West Allis, Wis.

Birmingham Low Bed

TRAILERS



Above: Birmingham Trailer part of order for Atomic Energy Commission.

Standard models, or made to special design to meet your needs. Illustrated above is Model 131-16100 DLU, capacity 100 tons. This model is equipped with swinging side brackets, which increase 12' wide bed to 15' wide when brackets are extended. Frame electrically welded, open hearth steel shapes. Birmingham trailers give you greater load capacity, ease of handling and rugged wear.

See us or our Distributors for special designs, catalog and prices.

BIRMINGHAM MANUFACTURING COMPANY, Inc.

P. O. Box 2838, Birmingham, Alabama

Stan Iskra's 5-A-920 Fuller Transmission piled up 750,000 miles in a Corbitt 28-TD-1762—and was still operating with original parts—when it was removed and repaired during an engine overhaul.

Longer wear-life is another *extra* designed into every Fuller Heavy-Duty Transmission.

These gears pictured here, for example, were taken from a Fuller 5-A-920 which logged 750,000 miles . . . 30 times around the world . . . WITHOUT OVERHAUL.

That's why owner Stan Iskra, of Bellevue, Ohio, says:

"After seeing all of the mileage which I have gotten out of this transmission, I wouldn't think of buying another truck that did not have a Fuller Transmission."

This particular tractor was in service hauling steel from Pittsburgh to Detroit and nearby points, part of the time pulling a double-dolly train. But its *longer* wear-life record could have been posted in any kind of heavy-duty hauling—off-highway or on—because there is a Fuller Transmission to match every "road and load condition." More than 101 models, in fact.

Choose a Fuller Transmission or Auxiliary for your rig. You'll find, like Stan Iskra, that it pays in more tonnage hauled at the end of the year for far less, particularly in maintenance.

Unretouched photographs above show the original gears, just as they came out of Stan Iskra's 5-A-920 Fuller Transmission, after millions upon millions of punishing contacts.

Fuller TRANSMISSIONS ®

FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.

Conn. Tests Material For Erosion Control

Highway Department's Roadside Development Engineers Try Out New Product Developed for Stabilizing Seeded Slopes

By WILLIAM H. QUIRK,
Eastern Editor

• THE problem of slope erosion—one of the banes of highway engineers—may be due for a licking with a new product developed in the Monsanto Chemical Co. laboratories in Dayton, Ohio, and tried out last year by the Connecticut State Highway Department. Known as Krilium, the product is a soil conditioner whose purpose is to protect soils against erosion; out of the hundreds of compounds Monsanto developed in this study, it is the one that produced the best results after exhaustive tests.

Krilium is a synthetic polyelectrolyte that looks like finely ground corn meal. While it is water-soluble when applied either as a powder or from an aqueous solution, it has properties that provide resistance to leaching. From results obtained to date, it appears that most soils containing appreciable amounts of silt and clay in their structure can be protected from erosion by treatment with this product.

Tests have indicated that by using Krilium, the plastic limit and water-bearing capacity of clay-containing soils has been raised considerably, while the rate of water loss through evaporation has been reduced. Soils so treated have demonstrated an increased ability to withstand splash or impact erosion, and an increase in germination. Krilium was developed to provide two principal functions: (1) To give treated slopes mechanical stability against the erosive action of water by means of a cementing or aggregating action. (2) To offer no resistance to seed germination or subsequent plant growth of the vegetative cover being established on the erodible slope.

Used at Airfield

Roadside development engineers of the Connecticut State Highway Department experimented with Krilium in conjunction with a 30-acre seeding program that the Highway Department was doing for the Connecticut Department of Aeronautics at Bradley Field near Windsor Locks, Conn. Bradley Field is a big state airport 12 miles north of Hartford, Conn., and 13 miles south of Springfield, Mass. Both cities use its facilities. The field is being expanded, and a new terminal building is under construction.

The seeding program has been spread out over the past two years, keeping pace with the improvements. The areas involved are located around the new terminal building, parking lot, access road, apron, runway, taxiway, and in a borrow pit that was opened to provide material for the grading operations. Over the entire site is a sandy soil most undesirable as a seedbed. Furthermore there was no topsoil available to spread over the barren sand.

Despite the poor conditions at the site, a good growth of grass now covers the sandy soil. The roadside development men followed the same procedures that they employ in highway work. Using the now familiar seeding machine in whose development Connecticut pioneered, the landscapers put down the seed and fertilizer in one operation. For seeding one acre, 1,200 pounds of 5-8-7 fertilizer was applied with 40 pounds of seed made up of the following types:

Chewings New Zealand fescue	40 per cent
Creeping red fescue	20 per cent
Colonial bent, Astoria strain	5 per cent
Alsike clover	5 per cent
Redtop	20 per cent
Perennial rye	10 per cent
Total	100 per cent

Seeding Machine

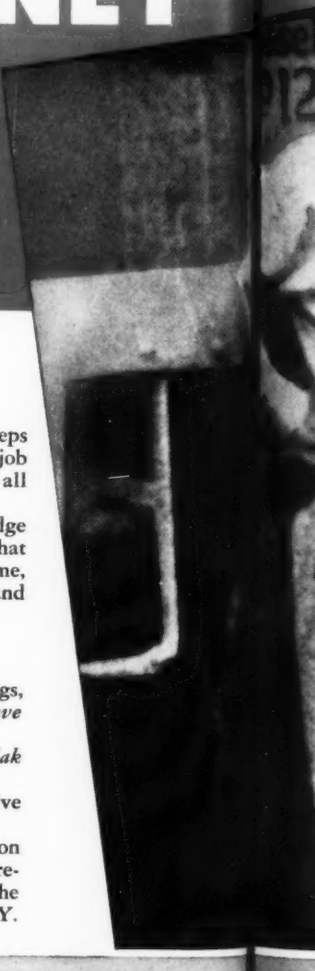
Mounted on a skid framework which can be put on a medium-size truck, the seeding machine consists of a 1,000-gallon tank through which runs an agitator shaft driven by a small 2-hp gas-

(Continued on next page)

Notice how vegetation is established on the left side of this slope where the soil was treated with Krilium—and, by contrast, how erosion has set in on the untreated soil shown at the right. The Civil Engineering Department of Ohio State University established these test plots.

"TEXACO KEEPS EQUIPMENT ON SAVES US MONEY"

—says John L. Carrickhoff, superintendent, Nello L. Teer Company, Durham, N.C.



Nello L. Teer Company — like alert and progressive contractors everywhere — keeps a sharp eye on costs; knows that to keep them low, equipment must stay on the job and out of the shop. That's why, for example, it uses *Texaco Ursa Oil X*** in all heavy-duty gasoline and Diesel engines.

*Texaco Ursa Oil X*** is both detergent and dispersive. Thus, harmful carbon, sludge and gum just don't exist. Engines stay clean, rings free; valves seat properly. That means better compression and combustion — less fuel consumption. At the same time, maintenance costs are less because engine parts are fully protected against wear and corrosion.

Other Texaco Money-Savers

For long-lasting chassis lubrication, use *Texaco Marfak.* It stays *in* the bearings, protects against wear and rust. *More than 400 million pounds of Marfak have been sold!*

For wheel bearing protection that requires no seasonal change, use *Texaco Marfak Heavy Duty.* It seals itself in, seals out dirt and moisture.

For crawler track lubrication, use *Texaco Track Roll Lubricant.* It gives effective protection even under severe conditions.

Let a Texaco Lubrication Engineer tell you about the Texaco Simplified Lubrication Plan — how *with only six lubricants* you can handle every major lubrication requirement. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

TEXACO

TEXACO

Krilium is sprayed on roadside slopes near Lisbon, Conn., using Connecticut State Highway Department seeding and fertilizing equipment.

oline engine. With a single charging the rig can seed and fertilize 1½ acres. In the first step 900 gallons of water were put in the tank. Then 60 pounds of seed and 1,800 pounds of fertilizer were added, and kept in a state of suspension in the water by the paddles on the agitator. The mixture was sprayed over the ground through a hose line by means of a 3-inch pump driven by a 30-hp gas engine, also carried on the rig. The spray of seed and fertilizer carried 125 feet from the truck.

The areas seeded were quickly covered with a hay mulch to prevent loss by erosion from either wind or water. Bales of hay were broken up by hand and distributed with a mulch blower. A ton of mulch material covered around 500 square yards. To hold the mulch in place, wheel harrows were pulled over the areas that were flat so as to press the hay into the ground. Along the runways where the winds seemed to develop more force, brush and snow fence were also spread over the mulch in order to retain it. Brush and snow fence were also employed on slopes where the wheel harrows were not practical.

Seed was sown throughout spring, summer, and autumn seasons with equally good results. In the fall, before the October 15 deadline, a top dressing was applied to the seeded areas. The dressing consisted of 10-6-2 fertilizer sprayed on by the seeder at the rate of 800 pounds to the acre.

Krilium gets into the stream through an eductor in the high-pressure line between pump and spray nozzle.

Krilium Tried

Monsanto's Krilium was tried out on a 3-acre plot adjoining the parking field near the new terminal building where the slopes are 2 to 1. Sections of the slopes were roughly marked off in areas covering 1,000 square feet, and the soil conditioner was applied over the seeding in amounts of either 5 pounds or 10 pounds to a section, or at the unit rate of ½ pound or one pound to the 100 square feet. In some sections hay mulch was spread out over the seeded area and the Krilium put on over the mulch. The rate of application in such sections was also ½ to one pound per 100 square feet.

Krilium was used along with the mulch in some test strips to see if it would help retain the hay on the slopes. But the principal objective of the experiment was to observe the results obtained with Krilium when it was used instead of the hay mulch to prevent erosion of the soil, and yet permit water to percolate through and help the seed to germinate. In these tests, after the seeding was completed, the material was spread uniformly over the slopes by hand at either of the two rates decided upon. The slopes were then wet down with a water spray to complete the treatment.

Forms a Film

After the water was applied to the compound, a thin film formed over the surface of the ground. This film is the crux of the process, for it serves as a cover for the seed, holding it in place, and yet it is sufficiently permeable to let water through, thus assisting the growth of the grass. Where mulch was also used, Krilium crusted over the hay and checked its loss by wind erosion. Bare sections were also left in the slope so that signs of erosion could be compared in the untreated and treated areas.

Besides the surface-treatment method of application used at Bradley Field, Krilium may also be raked into the ground. It is first spread uniformly over the slope area, and then mechanically worked in to a depth of about ¾ inch by raking or other means. Again it is followed with a light water spray to complete the treatment. Another method which has been used successfully is to apply the compound at the same time that the slopes are seeded and fertilized, with equipment patterned after the seeding machine.

In various other practical applications by Monsanto throughout the country, seed and fertilizer have been added along with the Krilium, and worked into the treated area in one operation. In other cases the seeding operations were carried out on the slope either before or after the treatment. Where the soil surface is dry, it is desirable to complete the treatment with a light wetting down to assist the film formation and aid germination.

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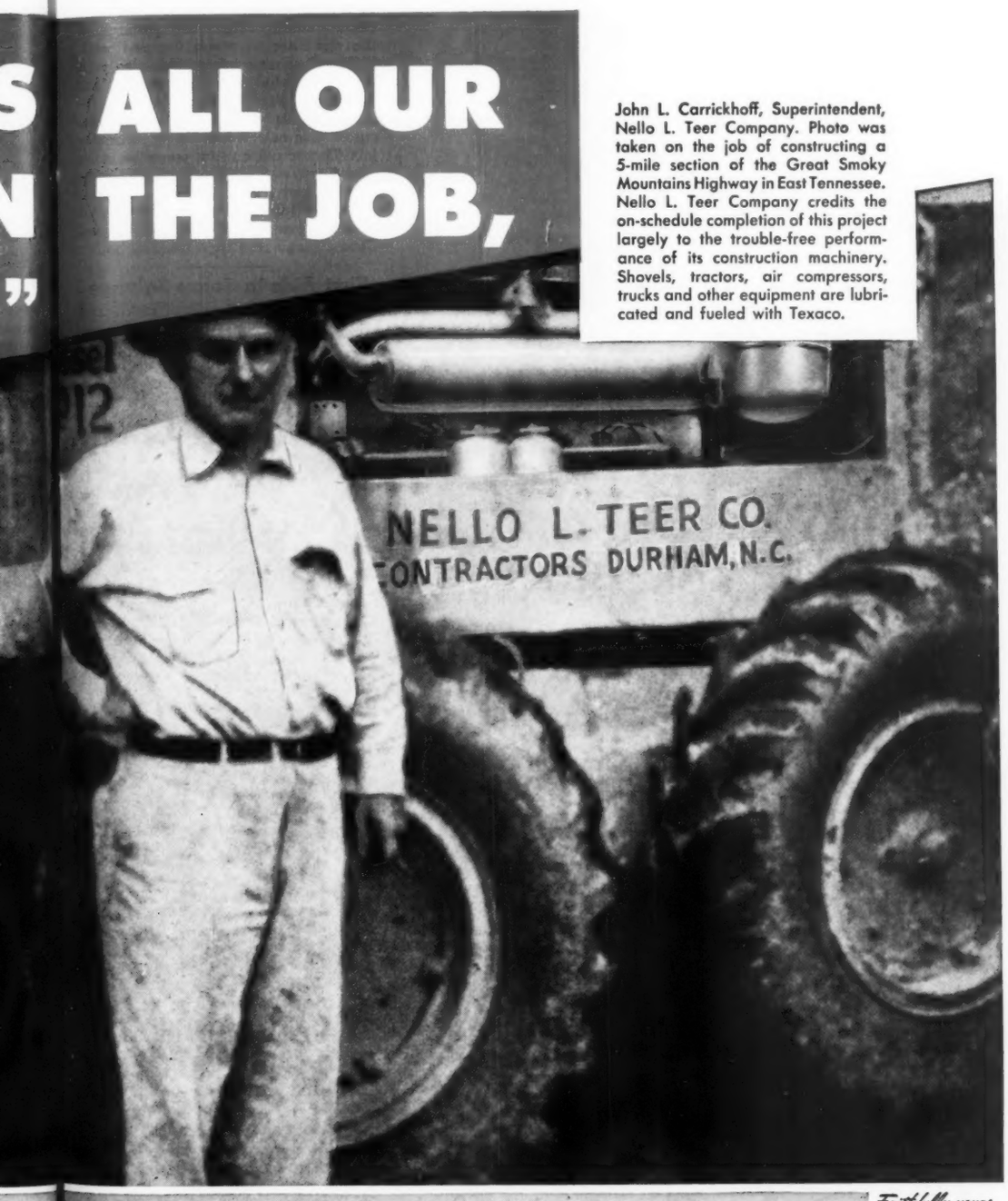

John L. Carrickhoff, Superintendent, Nello L. Teer Company. Photo was taken on the job of constructing a 5-mile section of the Great Smoky Mountains Highway in East Tennessee. Nello L. Teer Company credits the on-schedule completion of this project largely to the trouble-free performance of its construction machinery. Shovels, tractors, air compressors, trucks and other equipment are lubricated and fueled with Texaco.

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

Faithfully yours
TEXACO
50
for Fifty Years

Conn. Tests Material For Erosion Control

(Continued from preceding page)

Krilium appears to have definite possibilities in the mechanical stabilization of bare slopes against movement, while a vegetative cover is being established. At the same time this material apparently does not interfere with normal growth processes, although studies are not fully complete with respect to the species of plants and seeds tested to date. Best results were obtained in erosion control when one pound of the material was used for every 100 square feet of slope. While prices of the new product are necessarily not fully established, they are expected to compare favorably with those of mulches now in common use. When the work at Bradley Field was in progress, hay mulch was being purchased at $27 a ton.

As for the duration of treatment, field tests to date indicate that slopes which have been stabilized against erosion by treatment with Krilium will hold at least through one complete growing season. By that time grass should have assumed its function of holding the soil together. It is felt that the treatments may hold for a much longer period in areas not subject to severe frost action. According to Monsanto, more data are needed to determine whether the stabilizing effect of Krilium will endure through the winter months in areas where severe frost conditions are encountered, and where no vegetation has developed prior to freezing.

Personnel

For the Connecticut State Highway Department, William C. Greene, Landscape Engineer, directed the erosion-control operations at Bradley Field.

The tests that were applied by the Monsanto Chemical Co. were under the supervision of Dr. Reid G. Fordyce, Manager, Product Development, Plastics Division, with headquarters at Springfield, Mass. Charles L. Mills was field representative.

A Guillotine hydraulic cutter severs twisted reinforcing rods during the dismantling of an explosion-wrecked Chicago plant.

A Hydraulic Cutter Helps Dismantle Plant

The dismantling of an explosion-wrecked plant in the Chicago area involved the removal of bent and twisted ¾-inch reinforcing rods. A cutting torch could not be used because inflammable fumes were present in the plant, and a hacksaw would have been slow and expensive.

A Model 20-B Guillotine hydraulic cutter made by the Manco Mfg. Co., Bradley, Ill., solved the problem. It is a lightweight, portable unit and contains no components capable of igniting combustible vapors. Because the cutting head weighs 28½ pounds, operators could crawl easily throughout the structure to reach exposed rods.

The Guillotine is available also with power-operated hydraulic pumps, but a hand-actuated hydraulic pump supplying 45,000 pounds of thrust to the cutter was selected for this particular job. The actual cutting operation took an average of 8 to 10 seconds, the company reports.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 526.

First Aids in Scrap Salvage

The thousands of tons of nickel and other strategic materials that were recovered during World War II taught a salvage lesson that industry still remembers. To help in the current scrap drive, the Development and Research Division of The International Nickel Co., Inc., has outlined some simple tests for identifying nine wrought white metals and alloys in general use. It has also published a revised edition of "Rapid Identification of Some Metals and Alloys", a booklet that describes procedures for identifying more than 125 metals and alloys.

This literature is available without charge from the Technical Service Section of International Nickel Co.'s Development and Research Division, 67 Wall St., New York 5, N. Y., or by using the Request Card at page 16. Circle No. 433.

50-TON ON AIRPORT

FOUR-UNIT ON DAM

SIX-UNIT ON HIGHWAY

Southwest Compaction Rollers

SET NEW RECORDS for compacting heavier lifts with fewer passes. On the big jobs where maximum compaction is required the Southwest gets the work done quickly and efficiently.

Weight-box units of Southwest Compaction Rollers oscillate up and down independently and provide a constant, uniform compacting load on each tire regardless of ground contours. There is no bridging, no shifting of load from tire to tire.

Sectionalized tubular yoke allows the use of any combination from 3 to 6 weight-box units. Sizes and capacities range from 10 to 100 tons, suitable for light, medium or heavy duty compacting of earth.

Write for information

CONSTRUCTION MACHINERY DIVISION
Southwest Welding & Manufacturing Co.
Alhambra, California
HAULING SCOOPS BULLDOZERS LOADERS BOTTOM DUMP WAGONS RIPPERS TAMPERS SCRAPERS TREE DOZERS

SAVE
TIME • MONEY • LABOR

BALDWIN
HYDRO-ELECTRIC
TRUCK BED HOIST

Install a simple, self-contained Baldwin on your truck without moving or altering the bed. Dump your heavy loads without the use of gears or universal joints.

BUILT FOR HALF-TON PICKUPS AND VARIOUS LARGER SIZES TO 7½ TONS.

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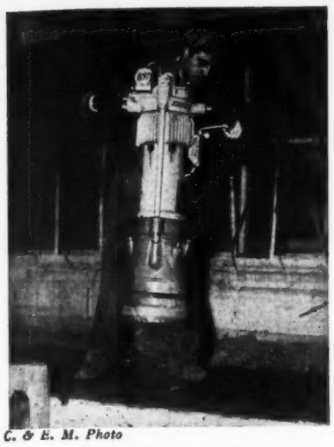


C. & E. M. Photo

A British-made Johnson rammer leaps 18 inches on each stroke to pack soil under a new addition at New York City's Memorial Hospital.

New Jumping Rammer Packs Soil Near Wall

A high-jumping rammer designed for both earth tamping and light pile or post-driving has been introduced to this country by Complete Machinery & Equipment Co., Inc., 36-40 Eleventh St., Long Island City 6, N. Y. The Johnson Super-Power rammer is manufactured by a British firm and has been used throughout Europe for many years. The machine may be fitted with a 10-inch-diameter heavy-duty base for work on large fill areas, a 7½-inch base for work in narrow trenches or tight spots, or a light driving head for setting sheet piling, timber posts, etc.

The rammer is gasoline-powered through the action of a free piston. It has no carburetor. The gasoline is contained in a tank which surrounds the piston. Steel wool in the tank atomizes the fuel. The vapors rise to a valve at the head of the piston. A magneto handle, struck by the operator each time the rammer touches the ground, causes a spark that ignites the fuel vapors and drives the piston downward. This forces the machine up into the air 16 to 18 inches. The impact of its return to the ground and the reaction of the next jump compacts the soil.

The company reports that even inexperienced operators quickly gain a facility for firing the magneto on the downstroke and guiding the 240-pound rammer in its forward motion across the fill. It operates best at 60 to 70 blows per minute and can work on lifts up to 20 inches, the manufacturer states. The machine will tamp right against walls and in close working areas.

The Johnson rammer is of simple design. It can be dismantled in a few minutes by loosening two nuts on the side rods. Oiling the exhaust ports with a drop can is the only lubrication required. An air-flow adjustment controls the fuel-air ratio for all operating conditions. Patented air cushioning of the piston dispenses with springs.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 466.

Tremco Opens Toronto Plant

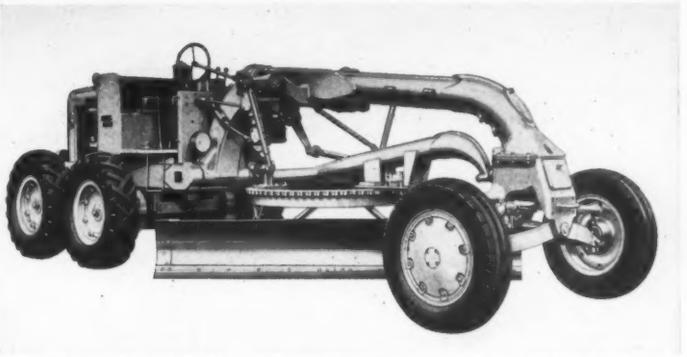
The Tremco Mfg. Co. (Canada), Ltd., recently opened a new $600,000 plant at Toronto to replace the original plant erected in 1931. The firm is the Canadian subsidiary of The Tremco Mfg. Co., Cleveland, Ohio, manufacturer of building maintenance and construction products, and both organizations have as their President William C. Treuhaft.

Both the offices and the manufacturing section of the new plant are so designed that work flows in direct circuits from entrance to exit. Material handling has been reduced to a minimum by the use of miles of pipe to carry essential fluids where they are wanted at the time they are needed.

Two Diesel Graders

Two new motor graders are announced by the Tractor Division of Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. A 4-cylinder 2-cycle diesel powers the AD-40 which weighs 23,000 pounds and develops 104 brake horsepower. The AD-30 is powered by a 3-cylinder, 26-cycle diesel engine, weighs 22,700 pounds, and develops 78 brake horsepower. General Motors diesels are used in both models.

Completely enclosed in the main frame is a hydraulic booster system designed to provide better steering control. The company also points out that a roomy platform, accessible controls, and an adjustable seat mounted on needle bearings adds to the operator's comfort. New lift cases, a low control box, a higher tapered platform, and a single tubular frame permit him to see while he is sitting or standing.

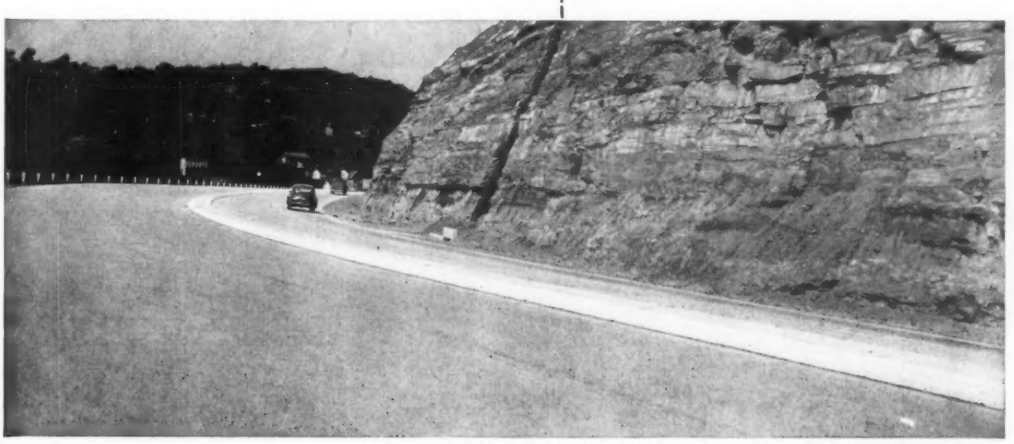


The AD-40 is one of the two new diesel-powered motor graders introduced by Allis-Chalmers. It weighs 23,000 pounds and develops 104 bhp.

A forward tilt of the combined fuel tank and seat gives access to the transmission, clutch, and driveshaft. Both clutch and transmission can be removed independently without disturbing the engine or floor plates. Mounted on the outside of the dash, the hydraulic pump and power takeoff are out in the open for easy inspection and maintenance.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 457.

This highway was "winterized" when it was built —with DURAPLASTIC



Section of highway in Allegheny County, Pa., near Pittsburgh, built with Duraplastic. White concrete reflecting curbs made with Atlas White Duraplastic. Designed by Pennsylvania State Highway Dept. General contractor: Harrison Construction Company, Pittsburgh; paving sub-contractor: McCrady Construction Company, Pittsburgh; White curb installed by E. Arthur James, Johnstown, Pa.

Come freeze or thaw or de-icing salt, this section of highway near Pittsburgh is ready for the winter's worst, because the concrete was made with Atlas Duraplastic air-entraining portland cement.

Duraplastic makes more durable concrete because it minimizes segregation and bleeding. Thus, concrete is fortified against the effects of freezing-thawing weather and the scaling action of de-icing salts.

Less mixing water is required for a given slump with Duraplastic cement. It makes concrete more workable, more cohesive and more uniform. Naturally, such a mix dumps, spreads and finishes easily. And it allows finishing close to the paver . . . permits earlier protection for curing.

YET DURAPLASTIC* COSTS NO MORE

It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

OFFICES: *Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.*

*"*Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.* CE-D-135

ATLAS® **DURAPLASTIC**

AIR-ENTRAINING PORTLAND CEMENT

A UNIVERSAL ATLAS PRODUCT

Makes Better Concrete at No Extra Cost

"THE THEATRE GUILD ON THE AIR"—*Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—NBC Network*

Expressways Lower Transportation Cost

How do urban freeways affect transportation costs? Can a state afford to build a road such as the Bayshore Freeway in San Francisco, which amounted to nearly $8,000,000 a mile? And how can freeway construction be financed? These and other questions were posed recently by Ralph A. Moyer, Research Engineer of the Institute of Transportation and Traffic Engineering of the University of California. Mr. Moyer delivered his address—"Effects of Freeways and Expressways on Transportation Costs"—before the Commonwealth Club of California in San Francisco.

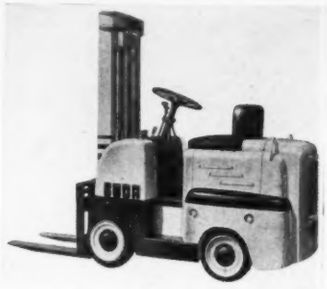
Mr. Moyer's answers were decidedly pro-freeway. "Taking into account both the peak-hour and off-peak-hour costs for passenger cars, trucks, and busses," he said, "I have estimated that the fuel, tire, and brake costs savings that can be obtained from urban freeways will average 1¼ cents per vehicle mile." As to time saving Mr. Moyer's opinion was that on an average the speed on freeways and expressways is about twice that on major streets. The accident rate, too, on urban freeways is in favorable contrast to that on city streets.

Combining vehicle-operating costs and time and accident cost savings, Mr. Moyer deduced that savings or benefits to the users of urban freeways is about 4 cents per vehicle mile. On this computation, an expenditure of more than $20,000,000 a mile is justified where the traffic reaches 80,000 a day.

Finally, in discussing the means of financing freeways, Mr. Moyer pointed to the toll system increasingly resorted to in the east, and to the fact that the revenue bonds used to build turnpikes there are self-liquidating and receive the approval of eastern banking houses.

Mack Motor Truck V. P.

Pierce J. Fleming, Manager of Mack Motor Truck Corp.'s Off-Highway Sales Division, has been elected a vice president of the company. He will continue to work at the firm's head office in the Empire State Building, New York City. Mr. Fleming joined Mack in 1918 and has held various managerial posts in the company.



This is the FT 30-24 in the new Buda series of fork-lift trucks with capacities ranging from 3,000 to 7,500 pounds. Six models are diesel and six are gasoline-powered.

Fork-Lift Trucks

An FT series of fork-lift trucks is announced by The Buda Co., Harvey, Ill. Powered by Buda diesel or gasoline engines, they are produced in 12 models on solid or cushion tires. Capacities are 3,000, 4,000, 5,000, 6,000, or 7,500 pounds at a 24-inch load center and 4,000 pounds at an 18-inch load center. The trucks come in five standard masts with lifts ranging from 6 to 12 feet.

Special features include an all-roller-construction mast with special rolled mast channels; two speeds forward and two speeds reverse with a single-lever gearshift; a quick-change heavy-duty clutch; and a full front-vision instrument panel. Most parts can be used on all 12 models.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 464.

HRB on Soil Compaction

The Highway Research Board, in its Bulletin No. 42, presents two papers on soil compaction which were read at the Board's Thirtieth Annual Meeting. The two papers are "Compaction of Unstable Material With Heavy Pneumatic-Tired Roller" by M. N. Sinacori of the New York State Department of Public Works; and "Some Comments on Earth Compaction" by Dr. D. P. Krynine of the University of California.

Mr. Sinacori deals with the experimental use of a pneumatic-tire roller to compact refuse fill for an arterial project in New York. He describes the results obtained when varying the weight of the roller from 12 tons (empty) to 50 tons (filled with sandbags). His paper also includes a set of recommended tentative specifications for special embankment-foundation rolling. Dr. Krynine examines compaction terminology and calls attention to the different types of tamping rollers. He also gives examples of how to choose between the dry and the wet side of the optimum moisture content. The papers are accompanied by diagrams and photographs.

"Soil Compaction" is available from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. It costs 45 cents.

Data on Hydraulic Jacks

An 8-page bulletin on hydraulic jacks has been issued by Templeton, Kenly & Co., 1020 S Central Ave., Chicago 44, Ill. It contains photographs, detail drawings, and tabulated data on hydraulic equipment in capacities from 10 to 100 tons.

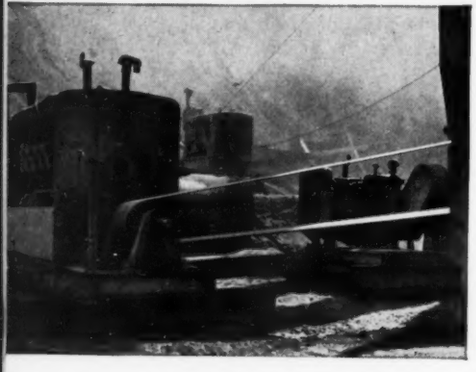
The folder features Simplex Re-Mo-Trol pumps and rams, including a full listing of accessories and attachments. Other jacks included are Simplex-Jenny hydraulic pullers, standard hydraulic jacks, and the new Simplex Rol-Toe foot-lift hydraulic jacks.

This literature may be obtained from the company by requesting Bulletin No. 51-4, or by using the Request Card at page 16. Circle No. 405.

A "Cat" D17000 runs the mixer, a D8800 the dryer, and a D315 the dust collector in the asphalt plant. A D17000 drives the portable crusher that supplies the aggregate. A "Cat" D8 Tractor with No. 8S Bulldozer stockpiles and feeds material at the plant.

He called it luck

but quality manufacture started it



LONG PERIODS of good performance in any power-producing machine depend on these major factors: *Good design, good construction, good care and good dealer service.*

The four "Caterpillar" Diesel Engines powering the Peter Kiewit Sons' Co. crusher and hot mix plant near Agoura, Calif., are proving they have *all* it takes to do a good job — while thousands of their mates are doing likewise all over the world. Many have run up records of 50, 60, 70 and over 100 thousand hours of operation — and they are still on the job. By proved field performance, the "Cat" Engines mentioned here are still young.

NOTE — Are *you* a "Caterpillar" owner? Remember: *Good care is good preventive medicine.* It takes only a few minutes to check starting, fuel, lubrication and cooling systems. It's no trouble having your "Caterpillar" Dealer inspect your equipment regularly. And when necessary, he can readily rebuild working parts before they become worn beyond repair. Good forethought is good business.

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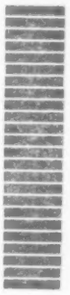

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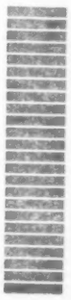

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Lightweight Hot-Mix Covers Bridge Deck

Dead Load on Willamette River Bridge Reduced by Mix; New Paving Does Not Affect Counterweight

• HOT-MIX made with lightweight aggregates and regular 86 to 100-penetration asphaltic cement has been used successfully to solve a problem in weight on a river bridge at Portland, Oreg.

When the Oregon State Highway Commission took over the Steel Bridge in Portland on a rental basis from the railroad company which owns the structure, the top deck which carries automobile traffic across the Willamette River was in a shabby state. It had been impossible to hold patented nailed paving blocks in place without excessive maintenance. The engineers were faced with the problem of replacing the pavement with material equally light but better suited to modern traffic. They were also limited to a paving weight of not more than 9 pounds per square foot, because the 200-foot vertical-lift navigation span, balanced with counterweights, was extremely sensitive to a change in weight.

General Construction Co., prime contractor with the Oregon State Highway Commission for the rehabilitation of the structure, was agreeable to practically anything the engineers could design. So was Cascade Construction Co., subcontractor for the pavement work. The problem belonged to the engineers.

Ordinary mixes of asphaltic concrete weigh between 146 and 147 pounds per cubic foot, and much as the engineers favored the use of that conventional material, they had to rule it out because of weight. Somebody, prompted partly by Oregon's success in using light volcanic cinders in some of the eastern parts of the state, got the idea of using a lightweight aggregate. An experimental mix was prepared, using as aggregate expanded-shale particles from ⅜-inch to No. 200, produced at the expanded-shale plant of the Empire Building Material Co. near Portland. This mix, containing Lite-Rock aggregate, weighed only 65 pounds per cubic foot, which more than met the reduced dead-load requirements of the paving design. When three truckloads of the mix were prepared and laid by maintenance crews on a highway outside Portland, the material went down in good shape and appeared to be satisfactory in every respect.

Deck Repaired

Construction crews repaired the bridge deck and got it ready for paving by ripping off the paving blocks. Underneath the old blocks was a deck of 4 x 12 fir flooring, set over a cross framework of 8 x 8 ties. In general, the wood was still in good shape. A few pieces were replaced, and along the east and central lanes additional 2 x 3 Chemonite-impregnated fir was nailed.

(Concluded on next page)

C. & E. M. Photo

Getting ready for the hot-mix paving on the Portland, Oreg., Steel Bridge. Workmen sprinkle hot asphalt on the treated-wood deck. In the background is the Barber-Greene laydown machine.

HOW TO CUT THE COSTS OF SOIL COMPACTING

Send for our bulletins describing the Vibro-Plus Terrapac Soil Compactor. The Terrapac combines great compacting ability, deep penetration, excellent maneuverability—with light weight and low cost. They'll save time and money in operation and maintenance. They'll help you show a profit on jobs, when other equipment can't.

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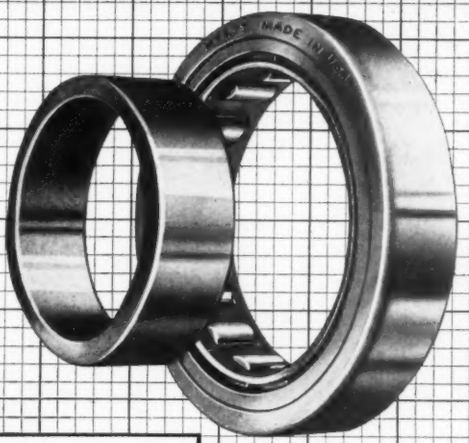
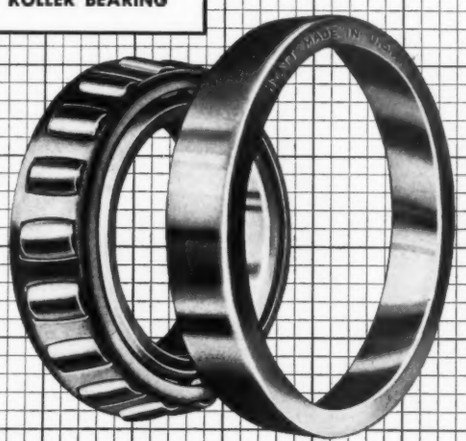


HYATT STRAIGHT CYLINDRICAL ROLLER BEARING



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HYATT ROLLER BEARINGS

Lightweight Hot-Mix Covers Bridge Deck

(Continued from preceding page)

The elevations were staggered slightly to give the asphaltic concrete a better bond and prevent it from shoving under the action of traffic.

The hot-mix material was prepared in a Madsen commercial plant which Cascade Construction Co. owns and operates in Portland. The first paving application, approximately 1¼ inches thick, was made on the 12-foot lane on the downstream side of the bridge. A Barber - Greene Tamping - Leveling Finisher laid the mix. Almost immediately, a 10-ton Buffalo-Springfield steel-wheel tandem roller moved in to make the initial compaction pass. It was a mistake. The mix developed cracks and started to shove.

The next lane was laid in the same manner, but initial rolling was done by a small 2-ton steel-wheel tandem. An hour later, final compaction was done by the heavier roller. This worked much better, and no cracks were immediately apparent. The 27-foot center lane was placed in three passes of 8, 9, and 10-foot width, and near-perfect results were noted on this work.

The asphaltic-cement content was raised from 21 to 23 per cent on the work after the first strip, but it made very little difference and engineers believed the initial mistake, if it could be called such, was in using too heavy a roller too soon after the paving went down. If these percentages of asphaltic cement seem high, it should be remembered that they are based on weight, and the expanded-shale aggregate is an especially lightweight material.

So far as field workmen were concerned, they noticed no particular difference in the material's laying characteristics. The operator of the Barber-Greene machine was enthusiastic about the mix, because, as he put it, "The stuff's so light you can lay it down without even putting a load on the engine of this rig."

The mix was designed by G. W. Harra, Materials Engineer for G. S. Paxson, Bridge Engineer. Both men are section heads working under the supervision of R. H. Baldock, State Highway Engineer.

C. & E. M. Photo

A small 2-ton roller puts on the first rolling of the lightweight-aggregate mix on the Willamette River bridge project in Oregon.

Heavy-Duty Hole Saws

A new line of high-speed heavy-duty follow-through-type hole saws has been introduced by Millers Falls Co., Greenfield, Mass. Blu-Mol saws can be used in portable power drills with a ¼-inch chuck for the smaller sizes and ½-inch or larger on the bigger saws. Or they may be used in radial drills, lathes, drill presses, etc. The complete line includes 40 saw sizes ranging from ⅝ to 4½ inches, 3 sizes of driving mandrels equipped with ¼-inch high-speed pilot drills, and a 12-inch mandrel extension.

The saws have a steel edge welded to an alloy-steel back and are capable of fast, clean cutting in any machinable material such as hard and mild steels, aluminum, brass and bronze, iron and steel pipe, plastics, etc., the company says. They cut holes to a depth of 1⅛ inches in solid stock. In addition, because the body of the saw is slightly smaller than the cutting diameter, the complete tool follows through the hole it cuts. This feature enables cuts to be made through two or more walls or partitions, through both sides of large pipes, or to any depth desired in stacked material.

Further information may be secured from the company. Or use the Request Card at page 16. Circle 487.

Blu-Mol follow-through-type hole saws feature a high-speed steel edge welded to a tough alloy-steel back, as illustrated in the circled portion of this photo.

Golden-Anniversary Booklet

A new booklet covers the products, company history, policies, and facilities of The Heil Co., 3000 W. Montana Ave., Milwaukee 1, Wis. An anniversary publication, it highlights in a concise friendly manner the company's accomplishments of the past 50 years.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 441.

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Diesel 2½-Ton Truck

A 3-cylinder diesel truck, said to be the smallest and lightest diesel commercialized for use on American highways, is announced by the GMC Truck & Coach Division of General Motors Corp., 660 South Boulevard, E., Pontiac 11, Mich. The D450-37 is a 2½-ton unit, available with five wheelbases for either truck or highway tractor models. It is designed for use by truckers operating in the GVW class of 19,500 to 35,000 pounds.

The 110-hp model has a maximum geared speed of 54.4 mph 9.00 x 20 10-ply tires, and a total gear reduction of 46.9. Models with 2-speed axles have an electrically operated shift control with the control button on the transmission gearshift lever to give the driver a quick positive control independent of vacuum or air-supply systems. Five-speed overdrive transmission is supplied.

Another innovation is an air-actuated hydraulic brake system, which combines air actuation with the advantages of dual-cylinder hydraulic brakes at front and rear. The new system gives the driver air-braking power combined with the brake "feel" of a pedal-controlled hydraulic system. Physical brake application still is possible before air pressure builds up.

The new GMC 2½-ton 3-cylinder diesel truck takes a grade with ease at the General Motors Proving Ground at Milford, Mich.

The engine is a 2-cycle 3-cylinder valve-in-head diesel. It uses direct fuel injection and a fuel modulator for proportioning fuel and air in the speed range below 1,600 rpm.

Further information on these GMC trucks may be secured from the company. Or use the Request Card at page 16. Circle No. 463.

Wire-Rope Trailers

A hydraulically controlled trailer for transporting wire-rope reels is manufactured by United Transportation Equipment, 752 Chestnut St., Redwood City, Calif. With it, one man can load full reels of wire rope or cable without using wheel chocks or a winch line.

To load, the carrier arms are lowered by opening hydraulic valves. The carrier bar is inserted through the cable reel, and adjustable spacers on the carrier bar are set to center the reel on the bar. Hydraulic valves are set in lifting position and the pumps operated. The carrier arms pick up the reel and reach the top of the travel where safety locks are engaged automatically. The reel can be held at any point during the lifting arc by closing the hydraulic valves. The landing wheel has a hydraulic cylinder to permit the towing eye to be elevated for connecting to the pintle hook on a truck.

The manufacturer points out that the load center of the loaded trailer is always forward on the axle, thus avoiding the possibility of overturning the trailer; that all hydraulic parts are standard and should be available from local suppliers; that the hydraulic carrier arms may also be used for other work such as lifting and transporting poles and pipe; and that the landing wheel, which replaces the usual landing stand, allows the empty trailer to be wheeled into locations where tilt-type trailers cannot be placed.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 415.

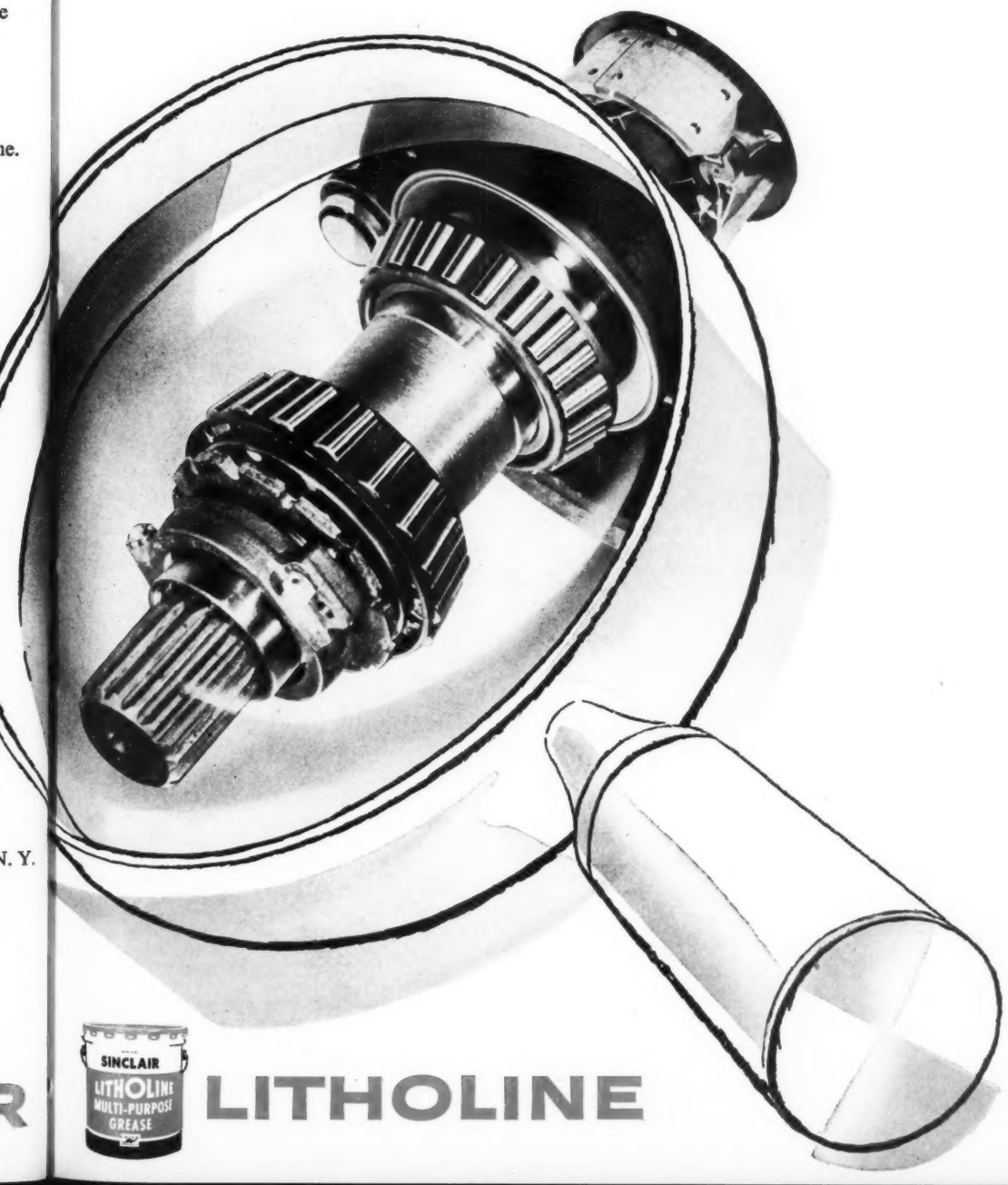
Pipe and Cable Tape

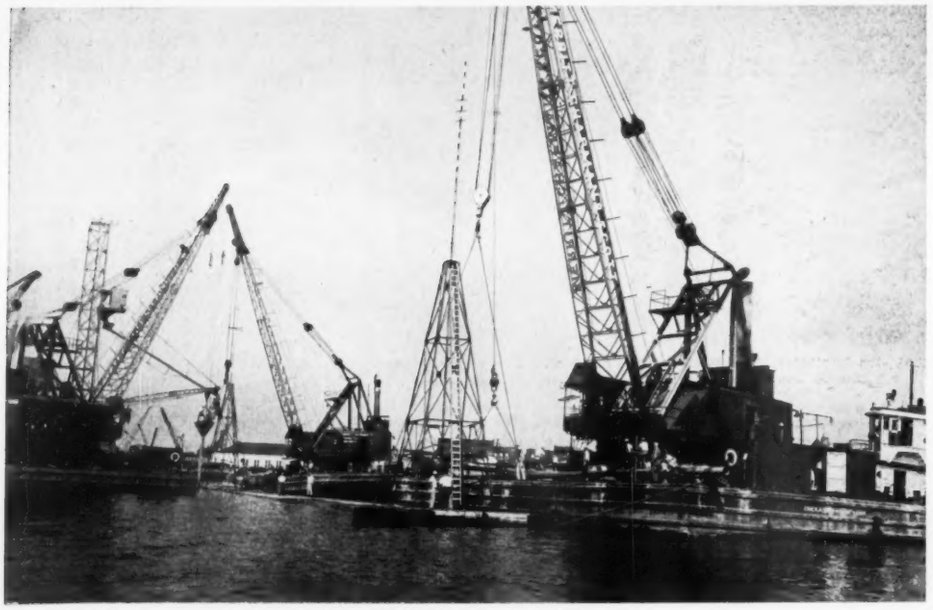
A heavy-duty plastic electrical tape has been announced by Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn. The Scotch brand tape No. 21 is recommended by the company for anticorrosion protection for pipes, cables, and equipment laid underground where resistance to cuts and abrasion by rocks during backfill is important. It is also recommended for protecting and insulating cable and high-tension leads subject to wear, abrasion, and rough handling, and for bus bars carrying high voltage.

The tape is available in 36-yard rolls ranging in widths from ¼ to 16 inches. It has a black, vinyl plastic backing that is 20 mils thick. It has a dielectric strength of 22,500 volts, an insulation resistance of 200,000 megohms, and an electrolytic corrosion factor of 1.0, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 404.

Scotch electrical tape No. 21 for protecting pipe, cable, and equipment laid underground is made by Minnesota Mining & Mfg. Co.





1. It's June 27, 1951, and tube C of the Norfolk Tunnel is in place over the trench prepared for it in the Elizabeth River. The M-C&S derrick boat Choctaw, at left in both pictures, holds the tremie chute, while the Chickasaw and the Chelsea support the tube with wire cables from their long booms. *C. & E. M. Photos*

Tubes Sunk for Norfolk Tunnel

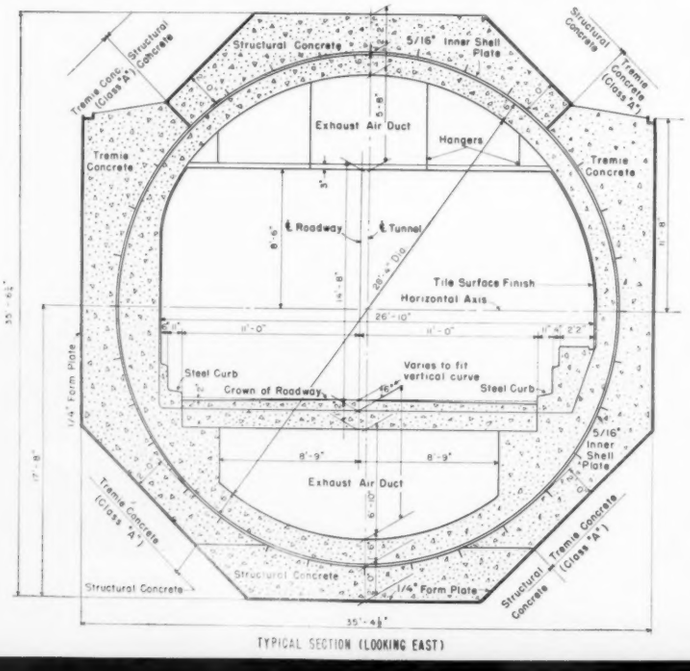
By WILLIAM H. QUIRK,
Eastern Editor
(Photo on page 1)

Tremie Concrete Placed in 300-Foot Sections Lowered Into Trench in River Bottom; Divers Connect 7 Tubes

• BY last month the seven 300-foot tubes comprising the river portion of the vehicular tunnel at Norfolk, Va., had been lowered into position and joined together in a trench dredged across the bottom of the southern branch of the Elizabeth River. The 3,350-foot tunnel (portal-to-portal length) is part of the new 1.8-mile expressway linking Portsmouth, Berkley, and Norfolk. Work on the project, which also includes a double-leaf bascule bridge over the eastern branch of the Elizabeth, started in February, 1950. (See C&EMonthly, November, 1950, page 48.) It is scheduled for completion in May of this year at a total estimated cost of $23,000,000.

Sponsored by the Elizabeth River Tunnel Commission, the construction is handled under a joint contract to Merritt-Chapman & Scott Corp. of New York City, and the Tidewater Construction Corp. of Norfolk. Engineering design and supervision of construction is also being done jointly by the consulting engineering firms of Parsons, Brinckerhoff, Hall & Macdonald of New York City, and J. E. Greiner Co. of Baltimore, Md. In general, the work is split up, with Merritt-Chapman & Scott the contractor, and Parsons, etc., the engineer on the tunnel, while Tidewater and Greiner are contractor and engineer, respectively, on the bridge. Bridge and expressway are four-lane design while the tunnel, which will be a toll structure, will carry two lanes of traffic.

The tunnel, connecting Portsmouth and the Berkley district of Norfolk, is downstream of the U. S. Navy Yard. Its 2,100-foot subaqueous portion under the ship channel consists of seven sections of double-shelled steel casing, each approximately 300 feet long. These tubes were fabricated under a subcontract by Bethlehem-Sparrows Point Shipyard, Inc., of Sparrows Point, Md. They measure 35 feet 4 inches across the width of the outer octagonal-shaped shell, and 31 feet 4 inches across the width of the inner ring. The inner watertight shell plate is 5/16 inch thick, while the outer shell, or form plate, is ¼ inch thick. Diaphragms are on 12-foot centers along the tubes between the inner and outer shells.



TYPICAL SECTION (LOOKING EAST)

Preliminary Work

As the tubes were fabricated, concrete was placed in the keel of each section before it was launched from the shipways, the amount varying slightly according to flotation requirements. This added weight of approximately 1,000 tons also served as ballast during the long 180-mile tow down Chesapeake Bay to the shape-up docks on the Berkley side of the river. Here the preliminary work was completed before the tubes were sunk, one by one, into position in the prepared trench.

Concrete for the interior of the tubes was mixed on a floating plant, and placed behind Blaw-Knox steel forms by means of a Rex 200 Pumpcrete machine. This work included completing the inner ring, which is 18 inches thick, and pouring the haunches and the 14-inch roadway slab. Curbs, the 2½-foot service walkway on one side, and the roadway paving, will wait until the tunnel has been opened portal to portal. Structural interior concrete was placed in the shell before sinking, leaving only the side pockets of the outer shell partially empty. These pockets were then filled with tremie concrete, placed in the 12-foot bags along both sides of the tube. In sinking the tubes, somewhat more than half the depth of the sides of the shell was poured. The remainder of the tremie-concrete work was not done until the tube was at the bottom of the river, and the pin connection made with the adjoining tube.

The inside 28-foot 4-inch finished diameter of the tube provides a roadway with a 22-foot horizontal clearance between curbs and minimum 14-foot vertical clearance to the hung ceiling. The inner concrete ring will be lined with glazed ceramic tile. Ventilation will be provided by electrically operated fans centrally controlled from a ventilation building at the Portsmouth portal. Air will be drawn in through the portals, and will be exhausted through vents leading to ducts beneath the roadway and above the ceiling slab. Since the tunnel is fairly short, as tunnels go, this one-way system of ventilation is possible. If its length were 3,500 feet or more, air would have to be both introduced as well as exhausted from the tunnel, according to general practice.

Floating Equipment

Merritt-Chapman & Scott Corp. assembled an impressive-looking fleet of floating equipment for the tunnel project. No. 8, the concrete plant, has a stiffleg derrick near the stern, equipped with a 65-foot boom and an Owen 1-yard clamshell bucket for charging the aggregate bins at the forward end of the long barge. Sand and gravel were furnished by Southern Materials Co. of Norfolk, and delivered to the site by barge. The sand barge was lashed to one side of the plant, and the gravel barge to the other.

Lone Star bulk cement from the Norfolk mill was stored in the contractor's 1,800-barrel covered barge which was stationed at the stern of the concrete plant. From the barge, a Fuller-Kinyon conveying system, consisting of an air and electric vacuum pump, forced the loose cement through a Fuller 6-inch cement transport pipe right up to the hopper on the mixing plant. City water was used in the mix, being tapped off a hydrant and delivered to the plant through a 1½-inch hose stretched from the nearest shore.

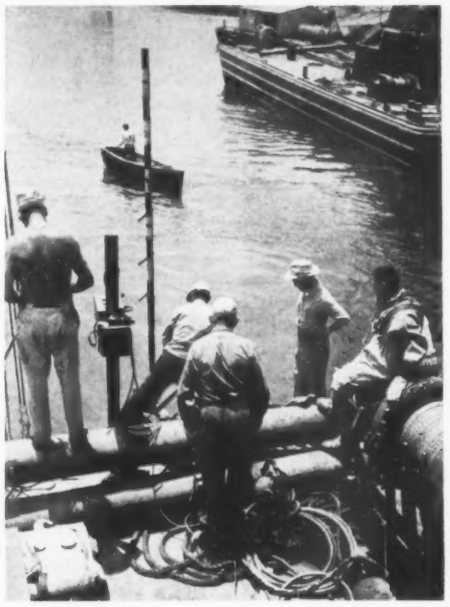
Batches were mixed for one minute in two Blaw-Knox 1-yard mixers, then discharged into a 1-yard skip which was raised in an 85-foot steel tower by a Lambert hoist. From a point in the tower, usually not more than two-thirds of its height, the skip discharged the concrete via a sectional chute into a hopper. At the bottom of the hopper were varying lengths of tremie pipe used in placing the concrete for underwater pours.

Floating rigs also included the big derrick boats Choctaw, Chickasaw, Chelsea, Crow, and Conductor. The Choctaw rig consists of a 110 x 50-foot steel hull, on which is mounted an R-25 American Revolver oil-burning crane equipped with a 90-foot boom and 15-foot jib of 50-ton capacity. The Chickasaw and Choctaw have similar

(Continued on page 22)

2. With the tube barely awash, tremie concrete is chuted into the sidewalls between inner and outer shells.

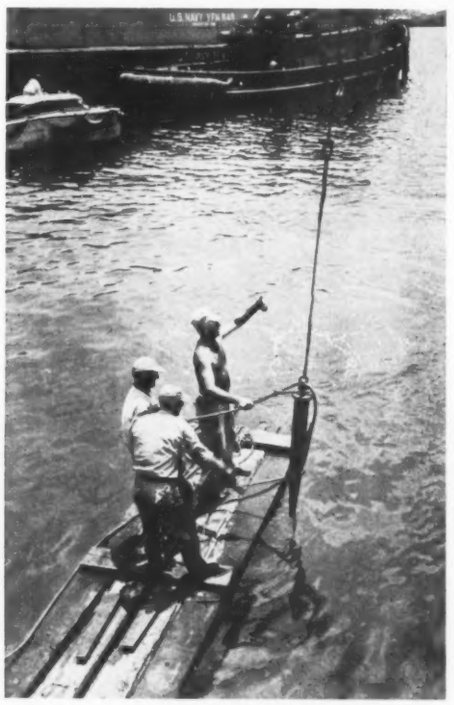
3. Now the rigs lower away and the tube, its side pockets half-filled and only its mast visible, starts to sink.



4. One diver has gone overboard to report the position of tube C with relation to D. A second diver waits.

5. The second diver goes down to check on alignment and report back to the derrick boat and shoremen.

6. Resident Engineer Murphy listens at the diver's phone, and lines are juggled to effect the closure.



7. Word comes that the tube lugs are in alignment and a connecting rod is lowered. Another will follow.

8. Concrete blocks are lowered to keep the tube from lifting until the rest of the tremie concrete is in.

9. Meanwhile, tube A, the next section to go in, lies moored at the pier, giving us some notion of what C, now cradled at the bottom of the river, really looks like.

C. & E. M. Photos

Seven Tubes Sunk For Norfolk Tunnel

(Continued from page 20)

designs, except that on this job the Chickasaw used a 100-foot boom and the Choctaw an 85-footer. The Crow and Conductor are Clyde and American Revolver rigs respectively, with 105-foot booms of 35-ton capacity. Towing was done with the M-C&S tug Canary, a 45-foot boat powered by a Kahlenberg 180-hp diesel engine. When required, the tug Jeanette of the Curtis Bay Towing Co. of Baltimore was hired to help out.

Seven Tubes

The seven 300-foot tubes were lettered A to G from the Portsmouth to the Berkley side of the river. Tube G, abutting the Berkley shore, was sunk first during March, 1951. F and E were sunk in April, D and C in June, and A and B, in that order, early this year. The trench into which they were lowered was dredged to a maximum depth of 55 feet below the riverbed, and to a width of 40 feet at the bottom to accommodate the octagonal-shaped tube. This depth allows a 2-foot sand foundation course for the tunnel, and a sand backfill cover at least 5 feet thick.

Present navigation depth of the 450-foot channel between pierhead lines is 45 feet, but provisions were made for a proposed future depth of 50 feet. Depth of water decreases from the pierhead lines up to the shore. At the deepest part of the tunnel, where tube C was sunk, the bottom of the structure is at minus 95 elevation, mean low water. The steepest grade in the tunnel, 5 per cent, is near the Portsmouth end.

For every foot of tunnel there are about 2 tons of structural steel. Thus a 300-foot tube contains approximately 600 tons of structural steel, together with around 5,000 cubic yards of concrete. Tremie concrete, 2,000-psi strength at 28 days, totals up to about 800 yards. The rest, which is structural concrete, is 3,000-psi design.

C. & E. M. Photo

Notice in this view of the end of tube B the collar plate around the full circumference and the semicircular hood plate with its lug that will hold the connecting pin—also one of five turnbuckles that will be taken up after the pins are placed.

Sinking Tube C

Tube C, the fifth and deepest of the seven, was sunk into position on June 27, and connected to the end of D which had been lowered into the trench on June 6. The C&EMonthly camera was at hand to catch the operations which were typical of the other sinkings. On the day before, divers had carefully inspected the trench to make sure that the sand and gravel foundation bed was clear and smooth to support the tube. At 3 a. m. the firemen on the floating rigs started getting up steam in the boilers, and an hour later the rest of the contractor's crew was at work.

A short distance off the Portsmouth shore the floating derrick boats Chickasaw and Chelsea were stationed just downstream of the cut into which tube C was to be lowered—the Chickasaw on the outside and the Chelsea in toward shore. From their long booms hung 1¼-inch steel-wire cables to support the 300-foot tube. Across from the Chickasaw, and upstream of the dredged trench, was the Choctaw, prepared to support the tremie chute when concreting started. Inshore from the Choctaw, all in line, were respectively a gravel barge, the concrete plant, and a sand barge. Behind the concrete plant was the cement barge.

Over on the Berkley side of the river at the shaping-up dock, the tugs Canary and Jeanette had put lines aboard the tube and started slowly across the channel. At 4 a. m. the river mists of the warm summer morning almost concealed the tube, so low had it sunk in the water. With its load of concrete, the tube had barely a foot of freeboard as it was maneuvered into position over the prepared trench. It was buoyed up, of course, by the air contained within the inner ring of the tube, which was sealed off at the ends by watertight bulkhead plates, ⅝ inch thick.

Rising from the top of the tube at each end was a combination tower and mast that served as target for transits and levels on shore. Line and grade were instrument-controlled during the sinking operations. The skeleton steel towers were 40 feet high, and supported masts whose tops were 70 feet

(Continued on next page)

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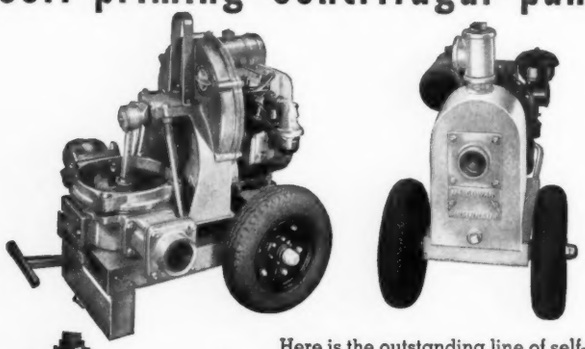

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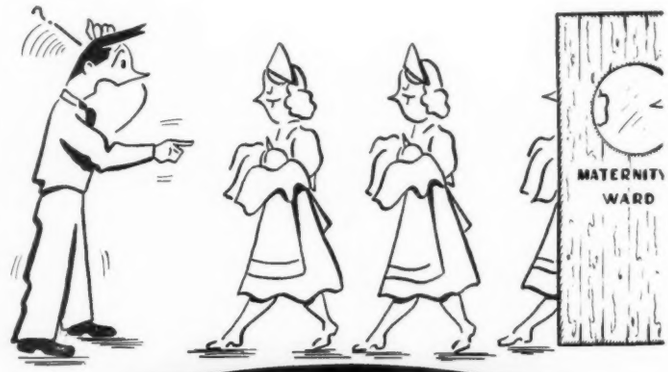

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above the plates of the tube. The four legs of the towers were bolted to angle irons welded to the top of the tube. After the tube was sunk, divers removed the bolts and the tower-masts were lifted off for use on the next section.

Closure Between Bulkhead Plates

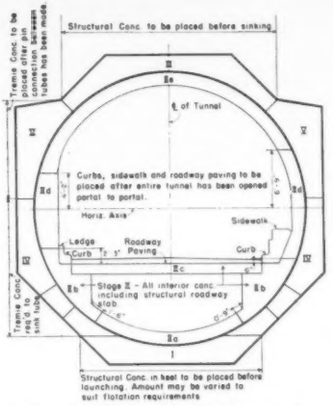
Outside the ⅝-inch watertight bulkhead plate at the end of the tube, the inner shell is extended 4 feet 3 inches with a ½-inch-thick collar plate around the full circumference; its diameter is 31 feet 4 inches. Overlapping the collar is a semi-circular hood plate, 3 feet wide x 1 inch thick. Half the width of this hood or cover plate is fastened to the collar by three rows of rivets. The other half slips over part of the 4-foot 3-inch collar plate on the adjoining tube, making an 8-foot 6-inch closure section between bulkhead plates.

The semi-circular hood is over the top half of the collar on one tube, and under the bottom half of the collar on the adjoining tube. Where the two half sections of adjoining hood plates come together, there are lugs on each side through which divers slipped tapered pins 4 feet long x 5 inches in diameter at the top. In the bottom of the pins below the lugs is a slot through which wedged-shaped keys were slipped to lock together the adjoining tubes. In addition, there are five turnbuckles around the perimeter with ratchets for pulling the adjoining collar plates together to form a butt joint. The ratchets helped in the positioning operations.

At the connection between tubes C and D, the hood or cover plate on tube C is on the upper half, while on tube D it is on the lower half. The preparatory work of the divers included cleaning off with pressure jets the collar, hood, bulkhead, and dam plates at the end of tube D. The dam plate, squared off with four sides, is an extension of the bulkhead plate to the sides of the outer shell. Pin and lug connection is similar to that used on the Detroit-Windsor, Ontario, tunnel, also designed by Parsons, Brinckerhoff, Hall & Macdonald.

Tremie Concrete

When the tugs had maneuvered tube C into position over the trench, the Chelsea and Chickasaw derrick boats made fast two 1¼-inch lines at each end—one line going under the collar and the other secured to the lugs at the sides of the hood plate. Thus the tube was supported, barely awash, while tremie concrete was placed in the sidewalls between the inner and outer shells. Placing continued throughout the length of the tube, first


Structural Conc. to be placed before sinking
Tremie Conc. to be placed after pin connections between tubes has been made
℄ of Tunnel
Curbs, sidewalk and roadway paving to be placed after entire tunnel has been opened portal to portal.
Horiz. Axis
Sidewalk
Ledge Curb
Roadway Paving
Curb
Stage II - All interior conc. including structural roadway slab
Tremie Conc. req'd to sink tube
Structural Conc. in heel to be placed before launching. Amount may be varied to suit flotation requirements
DIAGRAM INDICATING SEQUENCE OF CONCRETE PLACING BY STAGES

on one side and then the other; calculated yardage was placed in each of the 12-foot pockets on each side to distribute the weight evenly. This procedure was particularly important with tube C, which has two angle points, or changes in grade in its vertical profile, at the low point in the tunnel.

When the side pockets were a little more than half-filled with tremie concrete, the tube was heavy enough to sink of its own weight. Both rigs lowered away slowly, the top plates disappeared beneath the surface, and the last of the crew, now knee-deep in water, scrambled off the tube onto the derrick boats. The steel towers gradually vanished, leaving only a few feet of mast visible in the river as a target in the cross hairs of transit and level.

The tube finally reached its foundation bed in the trench, with the bottom at minus 95 elevation. Then two divers went overboard to report as to how close the lugs on the hood plates came together, and in which direction and how much the tube must be shifted in order to effect a perfect closure. The really delicate part of the work had now begun. Two-way telephone communication was continuous between the divers on the bottom and their tender on the derrick boat. Telephone lines also ran between the two derrick boats and to the instrument men on shore so as to coordinate the precise and minute movements of the big rigs.

Divers Take Over

After much juggling with the lines, up and down and from side to side, word came up from the depths that the two parts of the lug on one side of the tube were in perfect alignment. One of the big connecting pins was then lowered to a diver through nearly 90 feet of water. At that depth no light penetrated to the bottom of the river, and all contact was made by sense of touch. In the swift-running tide the pin eluded the diver at first, but after a couple more lowering attempts he finally got hold of it, slipped it through the lugs, and keyed it in position with the wedge through a slot in the bottom.

The first pin had been inserted just

(Continued on next page)

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The Dempster-Diggster's ability to dig hard and stratified materials without shooting is shown in photo at right. Note ample loading clearance. Dempster-Diggster, shown at work in Florence, Ala., is the Type GRD, Model 100.

This Dempster-Diggster, shown at work in Creighton, Pa., is also loading hard and stratified material without shooting. It is the Type CR, Model 100.

The Type GRD, Model 100-HL is shown above loading Hopper Bottom car, height of which is 10'8" from rail to top of car.

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Seven Tubes Sunk For Norfolk Tunnel

(Continued from preceding page)

in time, for the maximum 2-hour continuous working period for a diver at that depth had nearly run out. Air pressure for the 90 to 95-foot depth varied between 40 and 50 pounds, and at the end of two hours a diver was ready for the decompression chamber set up on one of the barges. After another series of adjustments as the 300-foot tube lay cradled in the cables of the floating rigs, the second diver inserted the pin on the opposite side. A third or standby diver with his tender remained aboard the rig to take over after the other divers had completed their work.

The ratchets were also pulled together, closing the joint between the tubes. To prevent uplift of the tube, due to a change in the specific gravity of the water or other causes, six concrete blocks were lowered to the top of the tunnel section and left there until the remainder of the tremie concrete was placed. Blocks were 20 feet long, 6 feet wide, x 4 feet high, and weighed 34 tons in the air and about 18 tons in the water. When they were cast, grooves for the supporting cables were cut into their sides near the third points for easy pickup with a 2-part lift. The divers directed their placing on top of the tube.

Time had passed quickly during these difficult operations, and it was late afternoon before they were finished. Despite the heavy blocks on top, it was decided to take no chances with any possible movement of the tube, and to place more tremie concrete that same night, nearly filling up the side pockets of the tube. The blocks were to be left in place until the next adjoining tube was sunk.

C. & E. M. Photo

Project Manager Burt Sanders, Resident Engineer George Murphy, and Project Engineer A. K. Burnham watch every move closely as tube C is laid to rest.

Final Connections

While the tubes were joined together on the outside, their interiors were still separated by the two bulkhead plates, 8 feet 6 inches apart, that enclosed a cylinder of water within the collar and hood plates. Specially built forms were then placed around this area to contain the tremie concrete that was placed to encircle the closure. When the dam plates at the ends of the tubes were fabricated, a half section of MZ-32 sheet piling was welded along each vertical edge. A semicircular ¼-inch steel form, with a corresponding sheet-pile interlock along the vertical edges, was slipped in between the opposite dam plates on each side of the closure section. The curved forms at the ends were built with a radius of 4 feet 3 inches.

Tremie concrete was later placed between the curved form and the collar plates, filling up the 8-foot 6-inch gap. It was poured down on one side until it came up the other, indicating that the area beneath the tube was filled in. Concreting continued until the top was completely filled over and the joint completely concreted.

The Unexpected Happens

Despite the careful precautions observed in the sinking, unexpected trouble developed with tube C. It had been the practice not to fill the sidewalls completely with tremie concrete, but to leave out a small amount in each tube after it was sunk until the

(Continued on next page)

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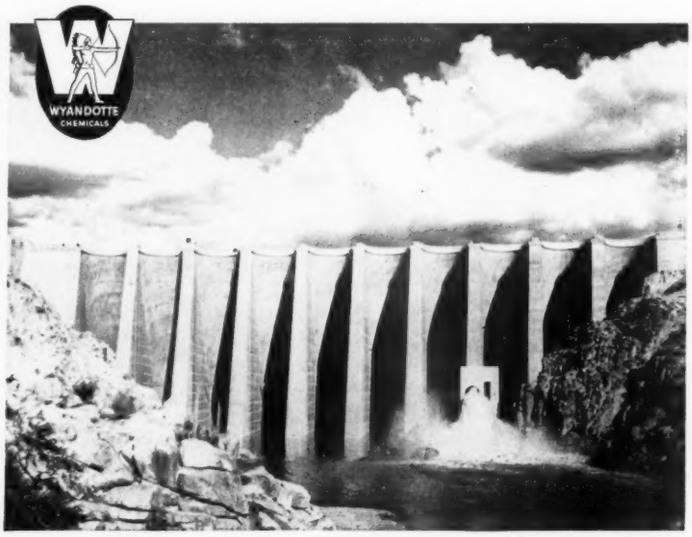

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Above 80°F 70°-80°F	1 lb. 1½ lbs.	32°-70°F Below 32°F	2 lbs. 3 lbs.

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time arrived for installing the adjoining tube. Then the last few hundred yards were poured, putting the tube on precise alignment for the next section.

In August, when a diver went down to locate the openings for the tremie pipe to complete the concreting of tube C, he had difficulty in getting his bearings. Finally after reaching the top of the tube, he felt his way along to the end which had been connected to tube D. Only tube D was not there. Tube C, it was soon discovered, had broken loose from its connection, and had floated upward some 10 or 12 feet from the bottom of the trench. It had partly keeled over, and was also out of horizontal alignment.

Further inspection revealed that the closure forms around the connection had been torn loose. On one side the wedge that had been keyed into the pin had sheared off, freeing the pin holding the lugs together. On the other side the pin itself had sheared, breaking the connection completely. Exterior damage to the tube was negligible, consisting only of slight bends in the hood or cover plate. This absence of serious damage was attributed to the design of the connection, which permitted the pins and keys to yield to the great uplift pressure that was exerted, and kept the tube itself from being bent, twisted, or sheared off.

Uplift Pressure

What happened at the bottom of the river to cause the tube to rise is hard to say. One factor alone was hardly the cause. Undoubtedly the specific gravity of the water at the sides and under the tube had increased to a point where it overcame the great weight of the structure and lifted it off the bottom. The consolidated backfill, which had been placed partway between the outer shell and the sides of the trench, apparently had not been sufficient to grip the tube solidly in place. Nor had the concrete blocks, without the backfill on top, carried enough weight to counteract the uplift.

The theory has been advanced that an increase of silt in the water increased its weight from 63-64 pounds to as much as 85-90 pounds per cubic foot. If this silty water got under the free or Portsmouth end of the tube, where no consolidated backfill had been placed along the sides and top, it could conceivably have affected the backfill farther back toward the connection. Work on the construction of the wet trench along the Portsmouth side may have contributed to the silting in that area. One unconfirmed report mentioned a tanker in steerage difficulties at the site a few nights before the diver discovered the mishap. With one screw of the ship at full ahead and the other full astern, the resultant churning of the waters might have contributed to the silting.

Resinking the Tube

Without waiting to ascertain the why and wherefore, Merritt-Chapman & Scott Corp. proceeded to set things to rights. Five of the contractor's biggest floating rigs—including the Monarch, largest commercial floating derrick on the east coast, with a total lifting capacity of 250 tons—put lines around the tube. They then "walked" the tube lengthwise back toward the Portsmouth shore, and laid it in the trench that had been excavated for the A and B tubes. The trench formerly occupied by tube C was then redredged. All silt was removed, and the foundation course of sand and gravel was again prepared.

The tube was resunk into position, connected as before, and the closure made. Concrete was placed satisfactorily within the semicircular closure forms, even though the sheet-pile interlocks at the sides were not used. This time the consolidated backfill was placed, through tremie pipes, not only for the full length along the sides of the tube but also on top—full length and to a minimum thickness of 5 feet.

Any additional time spent in cleaning off backfill around the Portsmouth end of tube C for the connection to tube B was not considered lost motion. This time tube C stayed in place.

Shore Junction

Following tube C, tube A was put in on January 3. It was drawn up close to the Portsmouth shore within a strongly reinforced wet trench about 50 feet wide. Its depth ranged from minus 65 to minus 95 MLW. Landward from the bulkhead at the end of the wet trench is a dry trench which contains the cut-and-cover section of the tunnel on land. The Portsmouth cut-and-cover section was subcontracted to the Sterling Foundation Co. of New York City.

The sides of the wet trench were sheeted by long steel master piles and intermediate piles, alternating flange-to-web construction, and braced with other steel sections stretched across and beneath the surface of the water. Tube B was sunk into position last, and fitted in between tubes A and C in one of the most spectacular operations of

(Concluded on next page)

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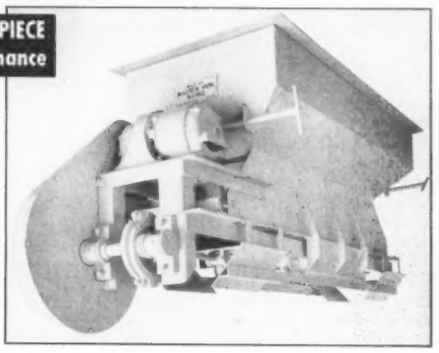

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Seven Tubes Sunk For Norfolk Tunnel

(Continued from preceding page)

the entire project. The sinking of tubes A and B was necessarily almost a continuous operation.

On November 19 the end or east bulkhead of G tube was removed with torches, thus giving access from the Berkley shore to the initial 300-foot tunnel section. Ten days later the joint G-F was dewatered, and the west bulkhead in G was removed. Dewatering was done through a 2-inch hose valve at the bottom of the bulkhead; a 1½-inch air vent was put in the top of the diaphragm. Bulkhead plates were burned out along the line of the inside concrete ring; beams supporting the bulkheads were likewise removed.

Following that the adjacent east bulkhead in F was burned out, and that tube was entered. Joint F-E was dewatered, and the west bulkhead in F was removed on December 6. Shortly after, the east bulkhead of E was burned out. Before working on the E-D bulkhead, the contractor went back to the first two joints—G-F and F-E—and welded seal plates to 6-inch WF 20-pound T-sections that extend out from the collar plates. The space between the seal and collar plates was filled with grout. Welding and grouting were completed at these first two joints before the E-D bulkhead was removed. The dewatering and removal of the bulkheads in the tunnel proceeded toward the Portsmouth shore. Other concrete work at the joint closures included the 18-inch inner lining, haunches, and roadway slab.

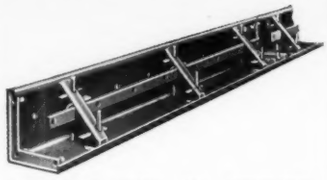
On the Portsmouth side Merritt-Chapman & Scott also built a steel-sheet-pile bulkhead and anchorage cell for the Seaboard Air Line's property. The contractor underpinned the line's double tracks and constructed a railroad bridge so that train service was continued without interruption. On the Berkley side, the 625-foot approach section was carried out by open-cut method. The main feature there was the construction of a railroad trestle and bridge for the Norfolk Southern Railway.

Personnel

Merritt-Chapman & Scott Corp. employed an average force of 200 on the tunnel project under the direction of Burt F. Sanders, Project Manager, with A. K. Burnham, Project Engineer. William Denny is Vice President in Charge of Marine and Heavy Construction, and Ralph E. DeSimone is President.

Parsons, Brinckerhoff, Hall & Macdonald, consulting engineer, is represented on the tunnel construction by George J. Murphy, Resident Engineer.

For the Elizabeth River Tunnel Commission, Thomas P. Thompson, Vice Chairman, is Executive Director of the project. Its chairman, James A. Anderson, is Commissioner of the Virginia State Highway Department.



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They are made of ¼-inch steel plate with the width of the base equal to the height. The end of each 10-foot section is reinforced by a heavy angle welded to the base and web. Steel pins slide into pipe guides, providing a connection that aligns the forms during the paving operation; the pins cannot fall out, and are beveled for easy entry into the pipe guide. A secondary staking system is provided to give additional lateral support to the form in soft or sandy subgrades.

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Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 461.

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A complete file of technical data sheets on its concrete chemicals has been issued by Reardon Industries, Inc., 2837 Stanton Ave., Cincinnati 6, Ohio. The company's products include air-entraining agents, hardeners, curing compounds, water-proofing materials, and concrete colors.

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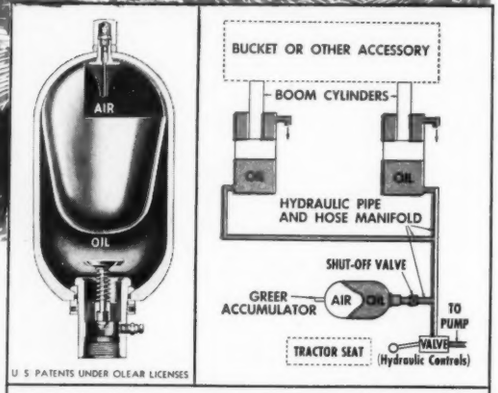

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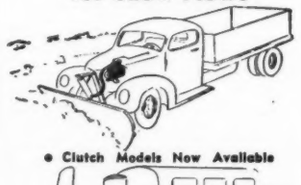

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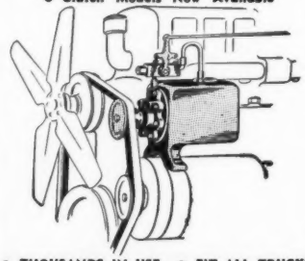

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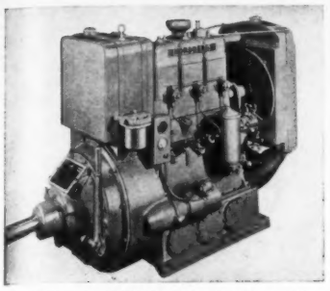
MONARCH ROAD MACH. CO.
323 N. Front Ave., Grand Rapids 4, Michigan



Nordberg's 4FS3 diesel engine is available with a clutch power takeoff for direct connection or belt drive. It is rated at 30 to 45 horsepower at 1200 to 1,800 rpm.

New Low-Hp Diesels For Heavy-Duty Work

A 3-cylinder diesel engine, rated at 30 to 45 hp within a speed range of 1,200 to 1,800 rpm, is now being produced by the Nordberg Mfg. Co., Chase & Oklahoma Aves., Milwaukee 7, Wis. The 4FS3 has a 4½-inch bore, 5¼-inch stroke, and is a 4-cycle, vertical, mechanical injection-type diesel engine.

The unit is available as an electric generator set or pumping outfit; and with a clutch or stub shaft, it can be used as a power takeoff for direct connection or belt drive. The generator set comes in dc or ac models from 20 to 30 kw in all standard voltages, 50 or 60-cycle. The pumping unit, built with side suction and two ball-bearing pumps, has a capacity of 500 to 3,000 gpm at 20 to 220-foot head. With direct or clutch power drives, the 4FS3 can be used with hoists, small shovels, well-drilling machines, and compressors.

Electric starting equipment includes a starting motor and a V-belt-driven battery-charging generator which is provided with a voltage regulator and reverse-current protection. The engine can also be started manually.

The 4FS3 is built for stationary applications with a radiator-type cooling system. Temperature is automatically controlled by a thermostat and recirculating connection on the outlet manifold. These cooling features are also used for marine auxiliary applications.

A diaphragm-type fuel-oil transfer pump with hand-priming lever is actuated by the camshaft. All fuel is strained and filtered three times before passing to the fuel-injection pumps. A mechanical flyball-type governor, gear-driven from the camshaft, regulates fuel delivered to the nozzles according to the engine load.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 513.

New Bearings Organization

The Association of Bearing Specialists is a new national trade organization incorporated under the laws of the state of Illinois. The Association has a membership of concerns throughout the nation whose primary purpose is to supply ball and roller bearings to the industrial trade. It held its first meeting last December at the Shamrock Hotel, Houston, Texas, under the chairmanship of William F. Chase, President, Bearing Service Co., Pittsburgh, Pa.

The following officers and directors were elected at the meeting: President, J. R. Gelomb, President, Iowa Bearing Co., Davenport, Iowa; Vice President, Gene Tappero, President, Michigan Bearing Co., Detroit, Mich.; Secretary, W. S. McClendon, General Manager, Behrings Bearing Service, Inc., Houston, Texas; Treasurer, Harold E. Johnson, President, General Bearings Co., Chicago, Ill.

Board members are as follows: William F. Chase (Chairman); G. W. Elftman, President, General Bearings Co., Los Angeles, Calif.; J. Hudson Crockett, President, Standard Machine & Supply Co., Norfolk, Va.; Frank J. Stevens, President, Bearing Distributors, Inc., Kansas City, Mo.; J. K. Weiser, President, Minnesota Bearings Co., Minneapolis, Minn.; and W. S. McClendon.

Clay-Products Catalog

A pocket-sized catalog containing information on sewer pipes, couplings, and other clay products is available from Universal Sewer Pipe Corp., 1500 Union Commerce Bldg., Cleveland 14, Ohio. Complete data on prices, discount schedules, dimensions, and features are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 429.

Safety Chain Links

"Universal" design has improved Wedglok safety connecting links for carbon and alloy chains, according to Interstate Drop Forge Co., 4001 N. 27th St., Milwaukee 9, Wis. Only two sizes of the new links are needed to connect chain from ¼ to ¾ inch, depending upon the type of chain used. Thus, it is not necessary to maintain complicated stocks for making chain or wire-rope connections or emergency repairs. The Wedglok links permit users to assemble chain slings from running lengths of chain, right on the job, without special equipment, according to Interstate.

Only two sizes of Wedglok links are needed to connect carbon and alloy chain from ¼ to ¾ inch.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 454.

3

TS 200 MOTOR SCRAPERS move 24,000 cubic yards of dirt in 35 hours on a turn-around haul for BOYD CONSTRUCTION COMPANY

"We've been building good roads for almost 50 years and we know what good equipment means to our success. Speed and trouble-free operation are two features we look for in our earthmoving rigs...that's why we have 3 LaPlant-Choate TS 200's on this job. Moving 24,000 yds. in 35 hours on a turn-around haul, and with a 9-12 yd. rig, is speedy production in any language."

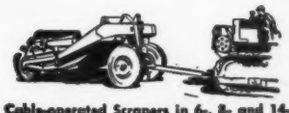
Says JOHN BOYD
Boyd Construction Co., Columbia, Miss.

NOW—LaPLANT-CHOATE TS 200's *are improved!*

SINCE John Boyd set this record with his three LaPlant-Choate TS 200 Motor Scrapers on the 500,000-cu. yd. relocation of Mississippi State Highway 7 around the Grenada Dam, capacities of the TS 200 have been raised from 9-yds. to 10-yds. struck, and from 12-yds. to 13-yds. heaped. Now you can also have your choice of power . . . a 176 HP Buda or a 165 HP Cummins diesel . . . to insure top working speeds at all times. Other production-boosting features include full hydraulic operation; positive, double-acting hydraulic steering; easy loading characteristics typical of all LPC earthmovers; positive forced ejection plus high apron lift; large 4-wheel brakes which allow top-speed operation (over 21 mph) with absolute safety. In addition, you get the rugged, sturdy construction that means low maintenance.

Get all the facts about the speedy, agile, powerful TS 200 Motor Scraper . . . the rig that's a money-maker on any size job. See your LaPlant-Choate distributor today.

LaPLANT-CHOATE MANUFACTURING CO., INC. CEDAR RAPIDS, IOWA, U.S.A.



Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.

2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.

Hydraulic and Cable-operated Dozers.

Mile-High Grading Reroutes U. S. 40

It Was Common Excavation, but Extra-Hard Conditions Made Careful Organization Imperative on This Road

• MILE-HIGH altitude, a location square in the center of Salt Lake City's water-supply watershed, tough digging, and a short working season combined to make one of the trickiest jobs of last season for W. W. Clyde & Co., of Springville, Utah. The job is a $373,000, 2½-mile reroute of U. S. 40 through Parley's Canyon, between Salt Lake City and Kimball's Junction. The special conditions are such that careful job organization is a must. With characteristic thoroughness, Clyde is meeting the conditions by planning for them in advance.

For example, it was his over-all plan to work the job from the east, or highest end. But a special detour at the west end looked as if it might give plenty of trouble if the equipment laid off that end entirely until late in the season, after fall rains and snow set in. One of the heavy cuts was therefore made in August, when the weather was dry, to get the detour in at the low end.

The Federal-Aid project includes grading, drainage structures, production and installation of crushed subbase, and a plant-mixed asphaltic-concrete surface. It will replace the present crooked, steep, 2-lane bituminous road with a straighter highway and gentler grades. The new road is to be an undivided pavement 60 feet wide, which will provide for 4 lanes of traffic separated by painted dividing stripes.

C. & E. M. Photo

U. S. 40 is rerouted through Parley's Canyon, Utah. Here a LeTourneau Model W Carryall, with D8's fore and aft, picks up a load of earth.

Severe frosts in early September had already colored the mountain cover red and yellow, and the results of early planning were evident. When the firm landed the contract, it planned to expedite the grading and drainage features during the 1951 season. Early this year, as soon as weather conditions permit, the granular subbase material will be produced and installed, and the asphaltic concrete laid to complete the job.

Perhaps if the project were at a lower altitude the winter might be less severe, but its location is almost at the top of a mountain pass near a ski-resort area. From October 15 to May 1, anything can happen, and it usually does.

Since the location passes through the water-supply watershed which furnishes Utah's capital city with water, unusual sanitary and fire precautions were immediately necessary. Burning of brush was permitted only under the most careful supervision. Sanitary provisions equal to those connected with

(Concluded on next page)

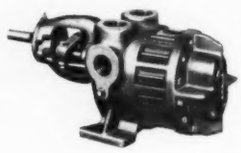
Pumps

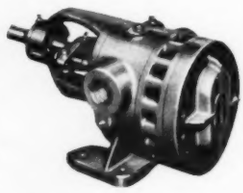
FOR MANUFACTURING PETROLEUM, MARINE AND PROCESS INDUSTRIES

MODELS FROM 3/4 TO 300 G.P.M. — CAPACITIES TO 1000 P.S.I.
SPEEDS UP TO 1800 R.P.M. FOR PUMPING CLEAN LIQUIDS

SERIES F

Four-port design offers 8 optional piping arrangements. Equal size helical gears run in axial hydraulic balance. Standard or bronze fitted; packed box or mechanical seal. Up to 300 P.S.I.—1 to 300 G.P.M. for clean liquids.



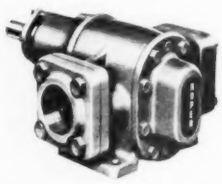


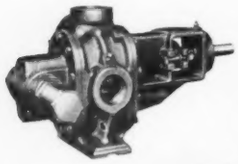
SERIES H

Widely used for hydraulic mechanisms and other applications where high pressures are required. Spur gears provide high volumetric efficiency. Packed box or mechanical seal. Pressures to 1000 P.S.I. — 5 to 75 G.P.M. sizes.

SERIES K

For hydraulic service, fuel transfer or fuel supply. Features helical gears and exclusive Venturi suction and discharge principle in 10 through 50 G.P.M. sizes. Packed box or mechanical seal. 150 P.S.I. — 3/4 to 50 G.P.M.





SERIES 3600

For general purpose work handling thin or thick liquids with suction lift up to 15 feet. Standard or bronze fitted; with or without built-in relief valve. Pressures to 60 P.S.I. — 40 to 300 G.P.M.

SEE OUR CATALOG IN SWEET'S

ROPER Rotary Pumps

GEO. D. ROPER CORPORATION
222 Blackhawk Park Ave.
Rockford, Illinois

THE RED U-BOLT TELLS YOU

1 They're drop-forged
2 Hot dip galvanized
3 They're genuine

CROSBY CLIPS

4 They're America's largest-selling DROP-FORGED WIRE ROPE FASTENERS
DISTRIBUTORS EVERYWHERE

AMERICAN HOIST & DERRICK CO.
ST. PAUL 1, MINNESOTA

CONCRETE CARTS
EASY to WHEEL—EASY to DUMP

Perfectly Balanced!

No. 626-PR Sterling Cart with dumping rockers and 4.00 x 18 pneumatic tires.

Just the cart you need for hauling concrete or other materials. Takes a full batch from small mixers without danger of spilling. 6 cubic foot capacity, water full. Sterling quality construction. Tray made of 14 gauge steel with continuous ½" diameter butt-welded rod to reinforce top edge. 1¼" T-iron rockers facilitate dumping. Roller bearings standard equipment. Choice of 30" dia. steel wheels or pneumatics. Write for Sterling Cart Catalog No. 63.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

A 5751-½

large-city construction were practiced.

Selection of Equipment

The 410,000-yard unclassified grading item included everything from plain topsoil to extremely rocky beds, with cuts ranging from a few feet to over 100 feet deep. It is the usual policy of contractors west of the Continental Divide to work tractor equipment as far as it will go, and then try something else. Fortunately, virtually all of the Parley's Canyon formation will respond to tractor equipment, although some is plenty tough to dig.

Clyde's earth-moving fleet was built around two spreads: a main digging outfit and a small finishing outfit. On the project he put four Caterpillar D8's with LeTourneau Model W Carryalls. Three D8's with dozer blades rounded out this equipment in a pushing and leveling capacity. One D8 was hooked on to two double-drum sets of LeTourneau sheepsfoot rollers. Two Super C Tournapulls handled some of the longer-haul work—and that was a sizable amount, for there were 1,650,000 units of Class II overhaul.

For earth processing, there was a 3,000-gallon water tank, truck-mounted. The job specifications were set up so that water was represented in units of 1,000 gallons. Compaction was set up in roller-hours. The 410,000-yard job was estimated to require 5,275 roller-hours of compactive effort.

For the most part the location of the new highway passes through scrubby mountain cover. In many places it was possible to strip this material with scrapers. Where the slopes were too sharp, or the brush was too heavy, a dozer pioneered and stripped the cover away.

Excavation and grading called for the equipment to work at a balance point until the grading was finished and the fills made. Then the equipment moved on to the next balance point. In general, only a rough job was done by the first spread, and all finish grading was done by one of the Carryalls, a D8, an extra D8-mounted dozer, and one of two No. 12 Caterpillar motor graders.

Banks were sloped generally by a motor grader, with a final rounding at the top made by dragging a tractor track at the end of a cable. This usually scaled away every loose particle and left the slope true and neat.

The maintenance of tractor equipment in such heavy grading was a particular problem. Track master pins are next to impossible to get now, and other parts are proportionately scarce. The day is coming closer and closer, according to General Superintendent Lorus Palfreyman, when his outfit may again start making some of the most critical parts, as was customary during World War II days.

You saw little or no slam-bang equipment operation on this project, especially in rock. Operators nursed the equipment along and tried to make reasonably good progress without tearing equipment apart at the seams. Mobile service rigs were on the job every shift with fuel and grease.

By snow time the crew hoped to have the roadbed all shaped, the many springs intercepted and trained through corrugated-metal pipe, and two main detours at each end of the project finished. When that stage was reached, the job closed down for the winter.

This season, a Cedarapids 2-unit crushing plant will be brought in and set up near the project. The pit is quite dirty, so the 2-unit setup is a necessity to remove dirt ahead of the crushing operation. This plant will produce the material for 60,000 tons of granular base course, and some 22,000 tons of mineral aggregate for the plant-mix surface.

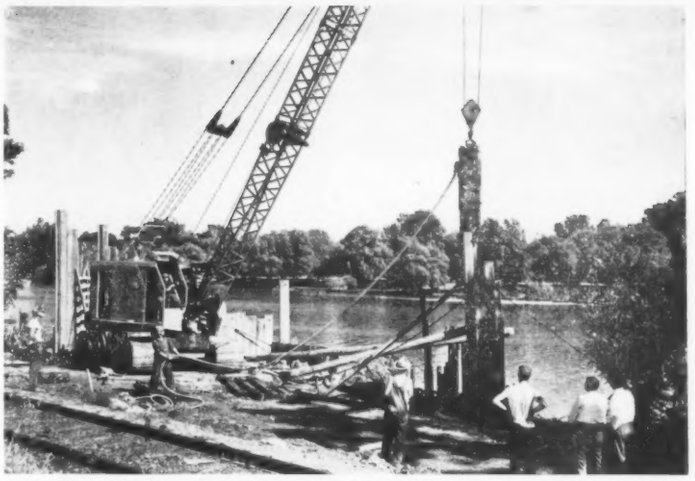
Hot-mix will be handled through a Cedarapids 3,000-pound batch plant, and Palfreyman expects about 15 dump trucks can haul gravel and hot-mix to the laydown machine. There should be little difficulty applying this material after the grading is finished.

Personnel

Utah's Department of Engineering is headed by Chairman D. H. Whittenburg. E. G. Johnson is Chief Engineer, and J. Q. Langford is Construction Engineer. M. R. Fenn is District Engineer; E. D. Kennelly, Resident Engineer.

Malsbary Mfg. Appoints Four

Malsbary Mfg. Co., Oakland, Calif., has appointed four new factory representatives, as follows: Charles William Gilmore, Philadelphia, to cover eastern Pennsylvania and southern New Jersey; James M. Williams, Nashville, to cover Tennessee, Mississippi, Kentucky, and Alabama; George Karikas, Cleveland, to cover Michigan, Ohio, and western Pennsylvania; Robert L. Garrison, Chicago, to cover Iowa, Illinois, and Indiana.

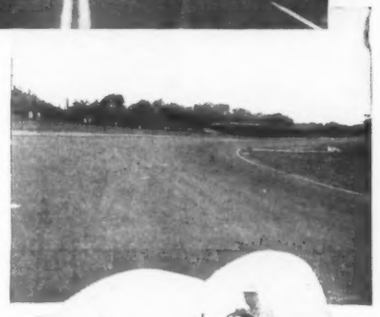


The City of Saginaw, Mich., plans to complete a new storm-water relief station this spring. Contractor Mancini-Miller-Thompsen, Detroit, sets piles with a 9B3 McKiernan-Terry double-acting hammer. A new Ingersoll-Rand 600 Gyroflow compressor driven by a General Motors 6-cylinder diesel engine furnishes air for the hammer.

ADNUN ROADS

are long life roads . . .

THE best testimonial to Adnun design is the excellent condition of the miles of Adnun laid roads that have carried 15 to 16 years of heavy traffic. The oldest machine laid roads in the world are Adnun Roads. Look at the heavily traveled highway above—a part of the Hamilton-Brantford road in Ontario, one of Canada's main arteries—laid in 1936. The one below—Colorado Blvd.—one of Denver's well known streets laid in 1935. And the bottom picture—part of the Indianapolis Speedway laid in 1936.



These are but a few of many photographs in our files that show prominent traffic arteries in city, state and county systems. These are roadways that bear heavy traffic counts: Streets that take the beating of trucking and speed under a full range of weather conditions. Note the eveness of wear *clear across*, the few signs of patching, the freedom from breakdown.

The Adnun principle of continuous Course Correction assures surface smoothness and a uniformity of course thickness that no other paver can equal. The Oscillating Cutter Bar action cuts the material off at the proper level and does not tear it. Material is carried up to the parallel course and is compacted in place, making a tight joint, a joint that will not throw a car off its course. *The Adnun builds longer life roads and safer roads.*

You will be interested in the booklet, "11 Basic Things." It will give you some new thinking on black top paving equipment. Send for it.

THE FOOTE COMPANY, INC.
Subsidiary of Blaw-Knox Co.
1916 State Street Nunda, New York

ADNUN
TRADE MARK REGISTERED

BLACK TOP PAVER

A BLAW-KNOX PRODUCT

These three photos show, left to right, hard-facing base being applied to a manganese-steel crusher cone by the Unionmelt welding process; the crusher mantle with base material applied; and final hard-facing overlay.

Hard-Facing Process Extends Crusher Life

The Unionmelt welding process is now being employed to hard-surface and rebuild crusher cones and mantles, reports the Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y. A special hard-facing underlay is applied first, and then overlaid with hard-facing rod. Units with long service, however, usually require a preliminary buildup of manganese steel. The process is not attempted on units worn more than ½ inch.

In a typical application shown in the accompanying photos, Unionmelt composition Grade 80 was used and a welding current of 300 amp at 30 volts ac was maintained, with welding speeds of 18 inches per minute. Approximately 70 pounds of underlay and 30 pounds of hard-facing overlay were deposited. The crusher part was first given a preheat from 150 to 200 degrees F. And during welding the temperature of the part was kept below 500 degrees F at all times, since prolonged heating at about 750 degrees F would embrittle the steel.

Further information may be secured from Linde. Or use the Request Card at page 16. Circle No. 510.

Accumulator Reduces Shock on Hydraulic Units

A method of eliminating the severe shock and vibration imposed on tractors and other carriers by hydraulically operated front-end equipment is described in a bulletin prepared by Greer Hydraulics, Inc., 452 Eighteenth St., Brooklyn 15, N. Y.

The literature points out that hydraulic fluid is practically incompressible; therefore the carrier must absorb impacts placed on it by front-end equipment. These occur when the working load is suddenly started or stopped, added or released, or moved over rough terrain. According to the company, a Greer Hydro-pneumatic accumulator in the hydraulic system will fully absorb these shocks; a precharged gas bag in the accumulator does the cushioning. It is also said to increase service life, relieve structural fatigue, and increase production by adding to the comfort of the operator. The units are available for use on all types of construction equipment.

This literature may be obtained from the company by requesting Bulletin 700, or by using the Request Card at page 16. Circle No. 502.

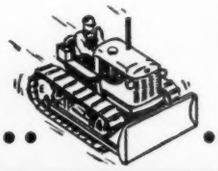
Safe Tire Changing

Ten fundamental safe practices to be followed in changing tires, particularly those of trucks and other commercial vehicles, are illustrated in a new poster issued by The B. F. Goodrich Co., Akron 18, Ohio. The illustrations are in cartoon style and their basic warning is to respect the terrific force represented by the air confined in an inflated tire. Eleven inches wide and 17 inches long, the poster can be put up any place where tire changers work.

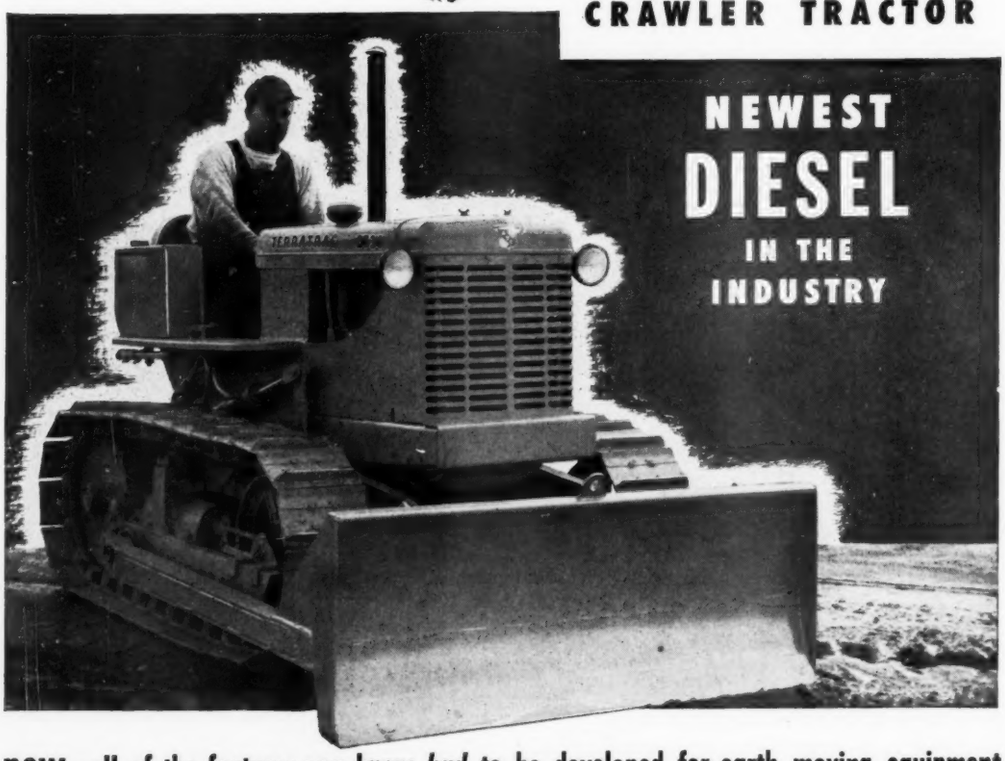
The poster may be obtained from the company, or by using the Request Card at page 16. Circle No. 518.

Form-Clamp Co. Promotes

D. M. DeCanio has taken over the post of General Sales Manager of Universal Form Clamp Co., Chicago, Ill., while at the same time retaining his position as Chief Engineer. Mr. DeCanio has been with the company for 14 years and is well known throughout the concrete-construction industry.

It's here!.....  ....new DT-34 CRAWLER TRACTOR

TERRATRAC



NOW—all of the features you knew *had* to be developed for earth moving equipment ARE FOUND IN BIG TERRATRAC DT-34 BUILT FOR BIG JOBS

Everyone is praising the Power, Speed and Maneuverability of the new Terratrac DT-34. Wide Track Shoes, Heavy Links and Large Idlers give the DT-34 the backbone to do the work of crawlers almost twice its price.

New Terratrac Bulldozers, Angle Dozers, Loaders and Winches have been specially designed to take full advantage of the power and stamina of the DT-34.

cuts costs!

AMERICAN TRACTOR CORP.

DEPT. CE-12, CHURUBUSCO, INDIANA

Please send me full information about the new DT-34 Terratrac and the name of my nearest Terratrac distributor.

Name_____

Company_____

Address_____

City_____ State_____

Write today for details

THE "Quinn Standard" FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.
WRITE TODAY. Complete information, prices, and estimates sent on request.
Also manufacturers
QUINN CONCRETE PIPE MACHINES

QUINN WIRE & IRON WORKS 1645-17 St. BOONE IA

The Gar-Bro Power tamp for concrete slabs, floors, sidewalks, etc., is powered by a gasoline engine and has a speed adjustable from 500 to 1,500 tamps per minute.

New Concrete Tamper With Gasoline Power

For tamping concrete for floors, sidewalks, and tilt-up slabs, Gar-Bro Mfg. Co. recommends its Power-tamp. This machine is designed to reduce voids and provide a vibratory action which tamps in rock and brings up mortar to make the finishing job easier. It enables the operator to tamp concrete which is partially set up.

The Power-tamp is one-man operated. It has an automatic clutch and governor-controlled speed adjustable from 500 to 1,500 tamps per minute. All bearing surfaces are fully protected from mortar and dust. A 2-quart-capacity gasoline tank enables continuous operation for four hours without refueling. The float is of abrasion-resistant moly steel.

Further information may be secured from the company at 2415 E. Washington Blvd., Los Angeles 21, Calif. Or use the Request Card at page 16. Circle No. 515.

Self-Erecting Tower As a Material Hoist

A portable automatic self-erecting tower, designed for hoisting materials on the job, has been developed by Buck Equipment Corp., 205 Butler St., Cincinnati, Ohio. Designed for one-man operation, the unit has a load capacity of 2,000 pounds and will lift material to a 40-foot unloading height.

Pneumatic-tired trailer mounting enables the machine to be towed easily by a pickup truck. It unfolds like a jackknife and can be completely erected in 25 minutes, the company says. The running gear retracts automatically when the tower is raised and returns to towing position when the tower is lowered.

This compact heavy-duty machine is powered by a 12-hp Wisconsin air-cooled gasoline engine. The tower itself is constructed of seamless hard-drawn-steel tubing and all sections are electrically welded. It may be used with a 5-foot 6-inch x 6-foot 6-inch platform or a self-dumping 9-cubic-foot concrete bucket. The standard tower is 25 feet high; additional 5 and 10-foot sections are available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 440.

Twenty-five minutes is erecting time for this Buck hoist tower. It has a load capacity of 2,000 pounds, will lift to a 40-foot unloading height.

DeSimone Is M-C&S President

Ralph E. DeSimone was elected President of Merritt-Chapman & Scott Corp., New York, N. Y., last December in succession to Raymond F. Kopp, who resigned as an officer and director of the company. Mr. DeSimone, who has been a member of M-C&S since 1916, was Executive Vice President and General Manager for a year prior to his new appointment. In that capacity he was in over-all charge of the company's varied operations in industrial, building, marine, and heavy construction, marine salvage, and heavy hoisting.

Mr. Kopp had been serving in the double post of President and Treasurer and he will now continue with the company in an advisory capacity. Marshal A. Staub, Assistant Treasurer, is named Acting Treasurer.

Mr. DeSimone is a registered professional engineer and a member of the Society of American Military Engineers and the Engineers Club of Boston, Mass. He is a trustee of The Moles, an organization of contractors and engineers active in heavy construction.

AEROIL HEET-MASTER KETTLES FOR ROAD & STREET BUILDING & REPAIR, *NOW AVAILABLE IN 230, 330 & 500-GAL. SIZES*

Save 50% on Fuel & Time

Now the famous HEET-MASTER Kettle that does the work of two bottom fired kettles is available in the larger sizes for big repair and paving jobs. (Ask for Bulletin No. 400RN.)

Other Bulletins you'll want to have on file:—No. 171 Asphalt Surface Heaters & Paving Tool Heaters; 502 Aeroil 400 to 600 Gal. Utility Trailer Sprayers; 397Y All Steel Tool Boxes; 637 Cut Back & Emulsion Sprayers; 174 Burners & Torches. Be sure you have these valuable FREE Bulletins handy for reference on your present and future equipment needs. ALL AEROIL Products are guaranteed for a full year against defects in workmanship and materials. Experience of over 33 years assures you of the finest and most economical equipment.

AEROIL PRODUCTS COMPANY, INC.

75 WESLEY ST., SOUTH HACKENSACK, NEW JERSEY

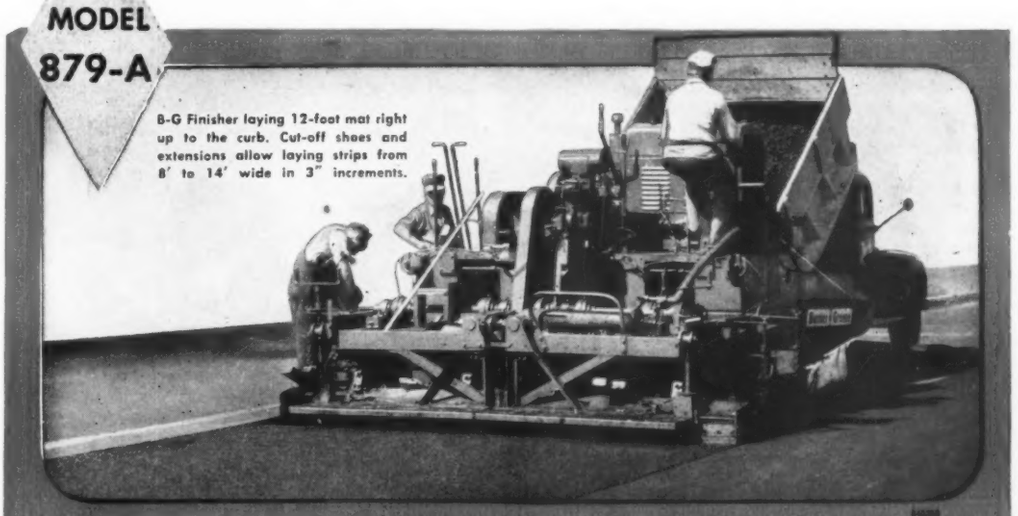
NEW BRANCH DEDHAM, MASS. & FORTY-FORT, PA.

Chicago • Dallas • San Francisco • Los Angeles • Seattle • Jacksonville • Pittsburgh

Barber-Greene

TAMPING-LEVELING FINISHER

MODEL 879-A



B-G Finisher laying 12-foot mat right up to the curb. Cut-off shoes and extensions allow laying strips from 8′ to 14′ wide in 3″ increments.

SPREADS material evenly

COMPACTS to uniform density

LEVELS automatically without forms

Unequaled method for properly laying a smooth, level surface for paving streets, highways, runways, parking lots, tennis courts and similar jobs.

The world's most widely used paving machine: gives superior performance in laying every type of surface — hot or cold — from clay stabilized gravel to high-type sheet asphalt.

Tamps, levels and strikes off simultaneously: *automatically* measures the correct amount of *compacted* material, produces a level surface that is maintained under rolling and traffic.

Compacts material as it is being laid: while it is hot and workable — assures a superior surface of uniform density, even when laid over an irregular subgrade.

Whether paving over new subgrade or resurfacing existing pavement, the B-G leveling principle assures a smooth, ripple-free surface without the need of forms . . . abrupt changes in subgrade cannot change the grade line of the mat.

High capacity with low maintenance: saves truck time, reduces the amount of rolling required and size of crew.

BARBER-GREENE COMPANY

AURORA, ILL., U. S. A.

See your B-G Distributor

New Dry-Pour System For the Repair of Piles

A new procedure for the repair of deteriorated piles has been developed by Masonry Resurfacing & Construction Co., Inc., Curtis Bay, Md. It is called the Dri-Por system, since it provides for complete restoration of the pile in a dry working area.

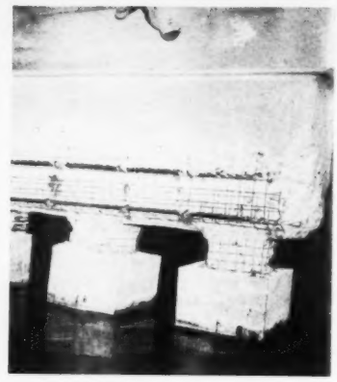
First step is placement of an open-top caisson large enough to encase the pile and provide working room for one man. The caisson is sealed to allow little or no water to enter. If water seeps into it, continuous pumping is employed to keep the area dry at all times. The floor of the caisson is set well below the damaged portion of the pile. Past experience has shown that deterioration occurs only between the range of high and low water level. The essential idea, then, is to replace and encase only the damaged section of the pile.

After the caisson is dry the pile is inspected to determine the extent of repair required. The eroded concrete is chipped with a pneumatic hammer to a clean, bare surface. If the cross section of the reinforcing steel has been appreciably reduced by rusting, it is replaced. With cleanup completed, wire mesh is anchored to the pile to strengthen and improve the repair. Then a metal form independent of the caisson and larger than the pile is placed around the pile and securely fastened; it remains in place permanently as added protection for the pile. The form is then filled with concrete using standard methods.

Gunite coating of the pile above the encasement is the final step. This work is usually started after a number of piles have been encased, to make the operation economical. It includes chipping the exposed area, covering with mesh, and shooting with Gunite. The coating provides a good-looking job and protects the pile encasement.

The company recommends its system because it obtains an excellent bond between old and new concrete; the added cross section and integral form give extra protection and strength; working in the dry insures a quality job and efficient performance. The one limitation is space; that is, the piles may be too close together to allow the smallest caisson to fit. The company points out that the method can be adapted for the repair of wood or steel piles as well as concrete. It can also be modified to meet special conditions —high tidal range, cold weather, etc.

Further information may be secured from the Masonry Resurfacing & Construction Co., Inc., B. & O. Coal Pier, Curtis Bay 26, Md. Or use the Request Card at page 16. Circle No. 407.



Three stages in the Dri-Por system of repairing piles: At left, the deteriorated pile before work on it is begun. Center, the placement of an open-type caisson so work on the pile can proceed in the dry. And right, some piles with their damaged sections encased in new concrete and their cap undergoing Gunite repair.

Lubricant Efficient At High Temperatures

An antifriction-bearing lubricant, Texaco high-temperature grease, is said to extend the efficient range of operation of ball, roller, and plain bearings at high temperatures. During its laboratory development, during a variety of standard and special tests for bearing operation, the new grease far outran the hours-to-failure criteria of normal tests at 300 degrees F, the company reports, and continued to exceed test specifications at even higher temperatures. The grease is said to be efficient at high speeds, and in operations where it must be retained for an abnormal time or where it must resist washing out.

Further information may be secured from The Texas Co., 135 E. 42nd St., New York, N. Y. Or use the Request Card at page 16. Circle No. 452.

Folder Describes Arc Welder

A 4-page folder on an engine-driven ac arc welder and power plant is issued by Miller Electric Mfg. Co., Appleton, Wis. As a welder, the unit supplies a current of 15 to 200 amps, and will handle 1/16 to 3/16-inch ac-dc electrodes. It is powered by an Onan 2-cylinder 4-cycle air-cooled engine. The power model furnishes 3-kw power at 60 cycles. All standard electrical equipment can be operated with this unit.

This literature can be secured from the company, or use the Request Card at page 16. Circle No. 523.

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The HEAVY-DUTY FLOOD LAMP THAT

Lights Your Work Better . . . Gives Longer Service at Lower Cost

Vibration-absorbing Base

Specially Designed for Efficient Service on
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"BUILT to take it," say users of STURDILITE Heavy-Duty Flood Lamps, after years of trouble-free service. Hermetically sealed-beam lamp—no reflector to become tarnished. Complete assembly mounted on rubber cushioned base that absorbs vibration and shocks. Available in 6-8, 12-16, 24-28 and 110-120 voltages.

COMPLETE BULLETIN, specifications, and quantity prices sent promptly upon request.

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where new products are constantly being developed to furnish you a complete line of superior vibration equipment.

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Please write for Viber's new illustrated catalog on its standardized line and new products.

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Concrete Vibrators Since 1931
Dept 55, 726 South Flower Street • Burbank, California

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Taxes Due When Company Reorganizes in Mid-Contract

THE PROBLEM: *An Oklahoma paving company was performing several long-term construction contracts when it was dissolved. Its assets were transferred to its parent corporation in a nontaxable reorganization. In assessing excess-profits taxes, the Commissioner of Internal Revenue allocated to the Oklahoma company the income earned under the contracts, on the basis of how much was completed on each one at the time reorganization occurred. Was this a proper allocation?*

THE ANSWER: Yes. (Standard Paving Co. v. Commissioner of Internal Revenue, 190 Fed. 2d 330, decided by the United States Court of Appeals, Tenth Circuit.)

According to the Oklahoma company, the method of computation involved indefinite amounts to be derived from money retained by the owners under the contracts and not payable until after the reorganization. Conceding that the company was liable for taxes on earned income as of the date of reorganization, the only accurate method of computation, the company argued, was to determine the income and deduct therefrom the accrued costs as of that date. The Court of Appeals replied that that "might be one way of computing the income" but that the method adopted by the Commissioner was "simple and accurate".

Partners' Income Taxes

THE PROBLEM: *Plaintiff and another person formed a partnership to perform a subcontract on a Navy base construction contract. Each leased to the partnership — without pooling — equipment used on the job, at rentals to be paid to each, regardless of profit in performing the subcontract. Plaintiff, one of the partners, reported as personal income for 1942 rentals received during the latter part of that year, on an accrual basis. The partnership, reporting for the fiscal year ending July, 1943, deducted the rentals paid each partner as expense for that year. There was no attempt to evade taxes. Was that proper accounting?*

THE ANSWER: Yes. (Shirley v. O'Malley, Collector of Internal Revenue, 91 Fed. Supp. 98, decided by the United States District Court for Nebraska.)

The court awarded plaintiff a refund of taxes paid under protest, rejecting the Collector of Internal Revenue's contention that the rental constituted profits accruing under the subcontract in 1943.

The court reasoned that, for the purposes of the case, the partners should be regarded as distinct from the partnership. This was especially so because each would be liable for one-half of any loss caused by the rentals, "but would not be entitled to one-half of the rentals paid by the partnership, since he did not own or rent one-half of the equipment to the partnership".

Roller Is Menace to Traffic

THE PROBLEM: *In darkness a tandem road roller was moving slowly along the middle of a highway that was being surfaced. A truck going about 30 mph passed an "Under Construction" sign and proceeded 7 or 8 miles before colliding with the roller. Poor lighting on the roller and its neutral color tended to prevent the truck driver from discovering its presence in the road. There was nothing in the stretch of road between the warning sign and the point of accident to indicate that road repairs had not been completed.*

In a damage suit against the contractor operating the roller, mention was made of the truck driver's negligence in failing to discover the roller before striking it, and the contractor's negligence in failing to give better warning of the presence of the equipment in the road. Could a jury reasonably determine that the truck driver's negligence, if any, was slight as compared with that of the contractor?

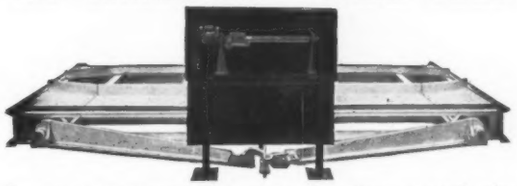
THE ANSWER: Yes. (Audiss v. Peter Kiewit Sons Co., 190 Fed. 2d 238, decided by the United States Court of Appeals, Eighth Circuit.) A new jury trial was ordered after a trial judge had summarily ordered dismissal of the suit.

The Court of Appeals reasoned: The contractor had failed to comply with a local—South Dakota—state law requiring reflectors on all commercial ve-

(Continued on next page, col. 3)

WINSLOW—PORTABLE TRUCK SCALE

"THE CONTRACTORS' SPECIAL SCALE"



For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site.
Capacities: 15-18-20-30 Ton—Write us for your nearest distributor

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P. O. Box 1198 Terre Haute, Indiana

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See how you save with

CHEVROLET

Advance-Design

TRUCKS

Fact No. 1

PAY LESS AT THE START

Chevrolet trucks list for less than any other trucks built to handle the same payloads. Here is a real, money-in-the-bank savings on purchase price. And you'll find the Chevrolet brings you ruggedness, stamina and great truck features not found in many other trucks.

Fact No. 2

GET LOWER ON-THE-JOB COSTS

Chevrolet trucks give you Valve-in-Head economy that saves gas, four-way engine lubrication that reduces wear and saves oil, and tough, rugged construction for longer truck life. Like truck users everywhere, you'll find Chevrolet trucks cost less to own and maintain.

Fact No. 3

TRUCKS BUILT FOR YOUR PAYLOADS

Chevrolet trucks are *factory-matched* to meet your requirements. You get the right truck for the job . . . never "too much" or "too little" truck. Frame, axles, springs, body, brakes, and power form a *balanced team.*

Fact No. 4

BIGGER TRADE-IN VALUE

Records show that Chevrolet trucks traditionally bring more money at re-sale or trade-in than many other makes. Chevrolet's market value stays *up* because the value stays *in.* More reason to see your Chevrolet dealer for your best truck buy!

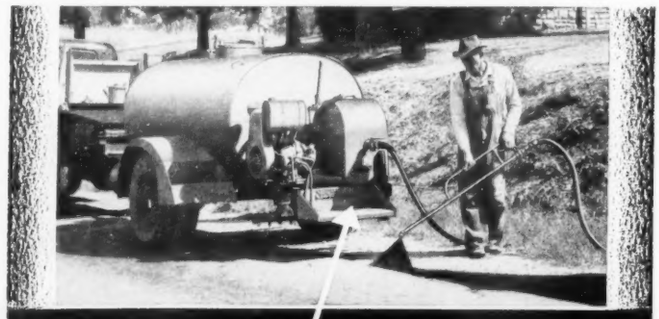
ADVANCE-DESIGN CHEVROLET TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

Black & Decker in West

At the beginning of this year The Black & Decker Mfg. Co., Towson, Md., opened a new branch office at 2432 S. Broadway, Los Angeles 7, Calif. The new building which serves customers in southern California, Arizona, and southern Nevada, features greatly expanded repair and stockroom space and a showroom for Black & Decker's line of portable electric tools. The Branch Manager is Waldo E. Bair, and the factory-trained service personnel is under the supervision of Service Engineer R. A. Lomas.



TEAM UP THIS STANDARD STEEL S-J WITH A STANDARD STEEL TAR KETTLE FOR LOW COST ROAD MAINTENANCE!

STANDARD STEEL TAR KETTLES

✓ You get three separate operations from Standard Steel Tar Kettles. (1) Hand operated spray assembly; (2) Motor operated, and (3) Gravity Draw off for bucket work. Uniform heat throughout mass of material eliminates "cold spots" or "burnt materials." Team up an "S-J" and a Standard Steel Tar Kettle and you can handle any repair work or secondary construction at less cost—less work—with less investment in equipment. Write for Catalog "TK".

STANDARD STEEL "S-J" for SECONDARY CONSTRUCTION

✓ Whether used for construction of playgrounds, driveways, parking areas, or for patching, sealing, shoulder repair or crack filling, Standard Steel "S-J" works fast—economically — efficiently.

SAVES WORK — a special "SUCK BACK" element cleans spray bar instantly after shutting off flow of material.

NO DELAYS STARTING — pump and entire piping system is instantly drained after completing a job — eliminating freezing and loss of time on *starting next job.*

SAFETY — Gravity Draw off on curb side protects operator.

Write for Catalog "S-J" for Further Details

OTHER PRODUCTS

Asphalt Pressure Distributors, Patch Rollers, Supply Tanks, Tool Heaters, Asphalt Tools, Street Flushers, Construction Brooms and Aggregate Spreaders.

Built to the Highest Standard

SJ6

Standard Steel Works NORTH KANSAS CITY, MO.

Avoid Legal Pitfalls

(Continued from preceding page)

hicles, and a red light on the rear visible for 500 feet. The cumbersome and immobile character of a roller on a well traveled highway especially requires precautions for motorists' safety. The color of equipment, rendering it difficult to discern, is another factor to be considered in determining necessity for warning.

When Employee Is Hurt During Personal Errand

THE PROBLEM: *After working hours, a state highway contractor's sodding superintendent drove to the contractor's office, principally to seek a personal loan or advance payment of salary, and incidentally to leave time sheets covering employees under his supervision. On the return trip home he was accidentally injured. Was he entitled to a workmen's compensation award on a theory that he was injured in the course of his employment?*

THE ANSWER: No. (Wall v. Aldrich, 50 So. 2d 680, decided by the Louisiana Court of Appeal, Second Circuit.)

The court applied to the facts of the case a legal test that most courts would probably apply: If an employee's duties as such require him to make a trip, he is regarded as being within the scope of his employment while going and returning, even if at the same time he serves a purpose of his own. But if the trip would not have been made except for the personal purpose, he is not to be deemed to be acting within the scope of his employment even if he incidentally does something that is part of his work. In this case, the superintendent was not bound to make the trip to the office to deliver the time sheets.

When Can a State Be Sued?

THE PROBLEM: *Ordinarily a state, being a sovereign, is not suable without its consent, which consent, as applied to public-works contracts, etc., is given in New York. But not every suit that affects a state is necessarily one against which it is immune.*

For example, in South Dakota a road contractor completed a job and it was accepted by the State Highway Department. There was money in the state treasury that had been appropriated for road building and it was available to pay the contractor. A balance was due him, but the state auditor had disallowed his claim, and there was no statute that expressly authorized him to sue. Could he sue the State to collect his balance?

THE ANSWER: Yes. (Alexander v. State of South Dakota, 48 N. W. 2d 830, decided by the South Dakota Supreme Court.)

The state attorney general contended that the suit could not be brought against the State because it was, in effect, one for breach of contract. The Supreme Court rejected that contention, on the intimated ground that when a state legislature sets aside funds to be used in paying for highway construction it thereby gives a contractor

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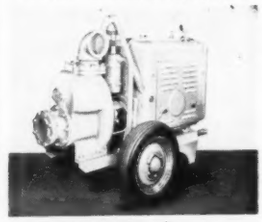
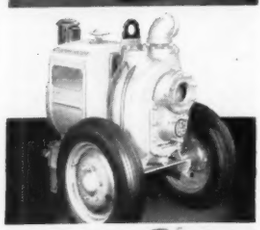
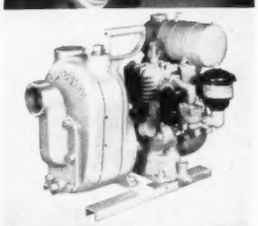
PUMP DESIGN At it's Best

CMC DUAL PRIME

THE LAST WORD IN PUMP DEPENDABILITY







• Unmatched self-priming speed is assured by *exclusive* twin jet construction.

• Extra hair-handling ability gives *dependable* performance when ordinary centrifugal pumps become air bound and lose prime.

• Non-clogging, open thrash type impeller handles solids up to ¼ intake size.

• CMC DUAL-PRIME pumps give top performance and maximum dependability even under the most adverse conditions.

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CONSTRUCTION MACHINERY COMPANIES WATERLOO, IOWA

THURMAN PORTABLE TRUCK SCALE

• Platform Lengths 18, 22, 24 & 30 ft.

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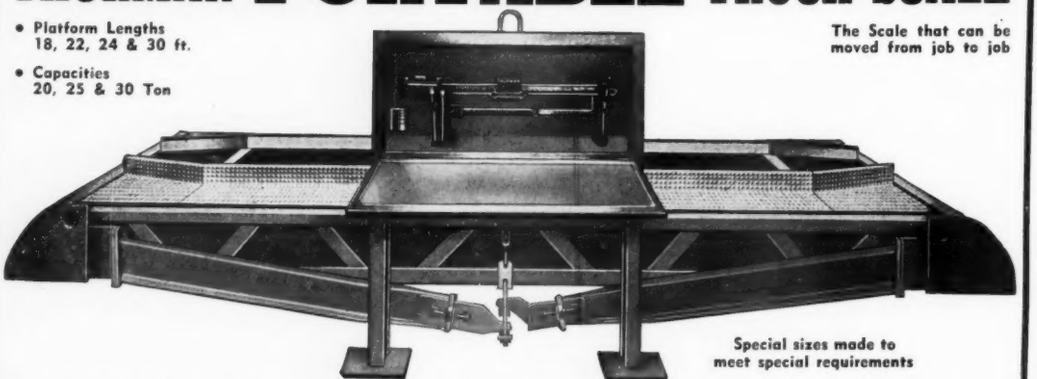
The Scale that can be moved from job to job



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Accurate and Portable—This scale can be transported from job to job by removing 6 nuts which hold side arms in place. The rest of the scale can be lifted as a unit. Once located, it can be readied for use in minutes.

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This and other weighing equipment in sizes to fit your requirements.

THE THURMAN MACHINE CO.—Scale Division

154 North Fifth Street Established 1918 Columbus 15, Ohio

Avoid Legal Pitfalls

(Continued from preceding page)

who has fully performed his contract the right to force payment if it is not voluntarily made.

The court differentiated a previously decided case where a bridge contractor was denied right to maintain suit against the State for damages for breach of contract, where there was no appropriation from which payment could be made. (Kansas City Bridge Co. v. State, 250 N.W. 343.)

False Statements Used To Secure Overpayment

THE PROBLEM: *Indictments against a state contractor and a former state comptroller charged that under a cost-plus construction contract the contractor sought to defraud the State; that he presented an invoice for $7,021.80 and falsely represented that the State owed $5,550.83 of that sum as the actual cost of labor, materials, etc.; that in fact the cost had been less, the exact amount being unknown; and that the other defendant, as comptroller, aided the contractor in defrauding the State by approving the invoice and thereby enabling the contractor to secure a check for $7,021.80. There were several counts in the indictments covering different invoices. The defendants were convicted.*

Were they entitled to acquittal on the ground that the indictments were fatally defective in failing to specify the items on which overcharges were made and the amount of overcharge on each of such items?

THE ANSWER: No. (State v. Story, 88 Atl. 2d 142, decided by the New Hampshire Supreme Court.)

The court recognized that the indictments must be supported at the trial by specific proof of overcharges. But it held that, as a basis for preparation of the defenses, the indictments were sufficient, because each count was based upon a specific invoice presented on a particular day. The court said it was understandable that, because of the existence of thousands of items entering into the invoices, the State might be unable to specify the exact amount of overcharge. The gist of the offense was the intentional securing of overpayment and not the precise amount thereof.

Materialmen Had Valid Lien Against Funds Due Contractor

THE PROBLEM: *Claimants furnished materials to a subcontractor on a municipal sewer job, and gave proper notice of their claims. Under Illinois statutes did they have a valid lien against funds, bonds, and warrants due the general contractor, limited by the amount due the subcontractor from the general contractor when claimants gave their lien notice?*

THE ANSWER: Yes. (Koenig v. McCarthy, 100 N. E. 2d 338, decided by the Appellate Court of Illinois, Second District.)

But the court noted that the statutes do not subject a contractor to unlimited liability. The lien right of those furnishing materials to the contractor or a subcontractor is limited to the amount earned and due before the contractor or subcontractor has defaulted. The court approvingly referred to a declaration of one of the Texas Courts of Civil Appeal in Thurber Construction Co. v. Kemplin, 81 S. W. 2d 103.

In that case, a subcontractor, through no fault of the original contractor, abandoned his subcontract while owing for labor and material accounts a sum far in excess of what he had earned under his subcontract. The court argued that if his creditors could subject to the payment of their claims the unearned funds of the general contractor, which were not due nor to become due such defaulting subcontractor, then the general contractor, who had nothing to do with incurring such excessive claims, would have nothing left from which to complete the project which his subcontractor had abandoned.

Road in Forest Preserves

THE PROBLEM: *Construction of a highway through a forest preserve caused incidental removal of growing timber from the site. Did this violate a New York constitutional prohibition against sale, removal, or destruction of timber in a state forest preserve?*

THE ANSWER: No. (D'Angelo v. State of New York, 106 N. Y. Supp. 2d 350, decided by the New York Court of Claims.)

"How can I relax? After all, I'm a contractor, and when I get to thinking what we pay for sand back home . . . ."

It's smooth, smooth going

on the Detroit Express Highway

FLEXCELL* JOINT FILLER keeps joints smooth, tight, maintenance-free!

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WHEREVER CONCRETE meets concrete, Flexcell Bituminous Fibre Expansion Joint Filler assures durable, trouble-free joints that *stay* neat and smooth—need no maintenance!

MILLIONS OF TINY air cells in the cane fibre base of Flexcell permit it to absorb pressure from expanding concrete without extruding—spring back to keep the joint closed when concrete contracts. This prevents bulges and bumps, does away with gaping crevices.

LOW IN FIRST COST, Flexcell Joint Filler is easy to handle, easy to work with. Gives neat, finished joints without trimming. Protected by the patented Ferox® Process from dry rot and termite attack. Impregnated with asphalt to resist moisture. Withstands severest service and climatic conditions—saves on maintenance year after year!

THESE ARE THE REASONS why Flexcell has long been specified by leading engineers, contractors and architects, as well as the U. S. Army, Navy and many other Federal, State and Municipal agencies.

SO BEFORE YOU BEGIN another job, investigate the advantages and economies of using Flexcell Joint Filler—for pavements, runways, sidewalks, curbs, gutters, driveways, concrete floors. You'll be glad you did. Mail coupon today for full data.

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Without obligation, please send me complete data and prices on Flexcell Bituminous Fibre Expansion Joint Filler.

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N. H. Commissioner Merrill Goes Back to Military Duty

Major General Frank D. Merrill, Commissioner of Public Works and Highways in New Hampshire, has taken an indefinite leave of absence to return to active military duty with the Federal Government. During his absence, John O. Morton, Deputy Commissioner and Chief Engineer, will serve as Acting Commissioner.

General Merrill is well known for his command, during World War II, of Merrill's Marauders — an illustrious band of men which won fame in the China-Burma-India theater.

C. R. Doyle Joins Gumout

Charles R. Doyle, Jr., has been appointed a field sales and service representative for the Gumout Division of Pennsylvania Refining Co., Cleveland, Ohio. His appointment is part of the company's stepped-up sales program for Gumout carburetor cleaner.

Here is the new Rex 5½-yard Moto-Mixer. The position of the water tank over the cab and the drum against the back of the cab gives better weight distribution.

New Transit Mixers

Two new sizes of transit mixers, the 5½ and 7-yard Moto-Mixers, are announced by Chain Belt Co., 1666 W. Bruce St., Milwaukee 4, Wis. Both models feature chain drum drive. The water tank in both is over the cab, and the drum is against the back of the cab for better weight distribution.

Also available with these units is a rear-end closure door which is said to eliminate spilling of concrete and to replace the discharge-door seal. A 60-hp 6-cylinder engine supplies power to the drum. Special blades, guards, spouts, and tanks are available as optional equipment.

Further information on the new Moto-Mixers may be secured from the company. Or use the Request Card at page 16. Circle No. 520.

Caterpillar's 3 Extensions

An expansion program that includes a new factory in York, Pa., additions to the Joliet, Ill., plant, and some improvements in the Peoria plant is announced by Caterpillar Tractor Co., Peoria, Ill. The demand for Caterpillar machines which has been intensified by military orders necessitated the program; it will be financed with a long-term loan of $35,000,000.

The York plant will be built on a site of approximately 180 acres just outside the city limits, will cover about 360,000 square feet of floor space, and will employ about 1,000 persons. It will produce track and track-roller parts, thus enabling the company to use eastern steel sources which do not at present supply its Illinois factories.

Major additions to the Joliet plant will be a 230,000-square-foot extension to the present manufacturing building where service parts will be made, a separate parts building covering 280,000 square feet, and an addition to the heating plant. This year the Joliet employees will be increased to over 3,000, and eventually about 1,000 more will be needed.

At Peoria, a new die-and-fixture building is going up as well as new office and shop buildings at the proving ground near East Peoria, to provide additional space and facilities for the Research and Engineering Departments.

Upon completion of the program, Caterpillar will supply parts to dealers from three principal locations—Peoria, Joliet, and York. Eight emergency parts depots are already spotted throughout the United States.

Catalog on Vibrators

The applications of the Air-Cushioned vibrator are illustrated in a catalog issued by Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland 13, Ohio. Designed especially for use on bins and hoppers, the vibrator can move a wide range of materials. The reciprocating action of its piston develops the vibrating action. An air pocket at each end cushions the momentum of the piston and eliminates noise, the company claims.

This literature may be secured from the company, or by using the Request Card at page 16. Circle No. 511.

GET A FREE Tuffy® SLING AND PROVE TO YOURSELF IT'S MORE FLEXIBLE!

Yes, here's your chance to see for yourself the braided wire fabric of which TUFFY Slings are made. Tie it in knots, kink it—then see how easily a Tuffy sling can be straightened out without material damage.

Patent No. 2,454,417

HOW Tuffy® SLINGS ARE MADE

Scores of wires are stranded into nine parts, then machine woven into an interlaced wire fabric. This braided fabric gives extra safety and enduring strength. Even cutting one of the 9 parts does not result in stranding of the sling.

11 TYPES—PROOF TESTED FOR SAFETY There are 11 different types of Tuffy Slings, each one proof-tested to *twice* its safe working load. And the safe working load is plainly marked on metal tags on each sling. Also, Union Wire Rope engineers will help work out special sling problems. If you have your own rigging loft, Tuffy braided wire fabric is available by the reel.

FREE SAMPLE—MAIL COUPON

To show you the difference between TUFFY Braided Wire Slings and ordinary wire rope slings, we have made up a quantity of 3-foot slings. We want you to have one so that you can test it and prove to yourself that TUFFY Slings really are better. Mail the coupon below today for yours.

UNION WIRE ROPE CORP. More scrap means more steel turn yours in today!

UNION WIRE ROPE CORPORATION
Specialists in Wire Rope, Braided Wire Fabric and High Carbon Wire
2260 Manchester Ave. Kansas City 3, Mo.

Gentlemen: Please have my Union Wire Rope fieldman deliver me a FREE Tuffy Sling.

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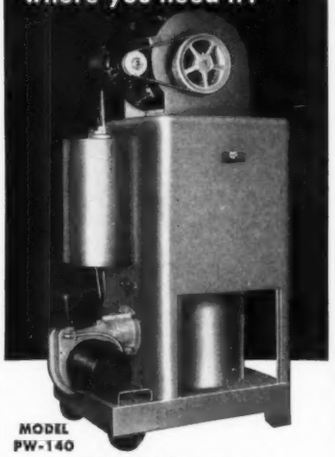
EXPERT REPAIRS All Makes
USED INSTRUMENTS Bought and Sold
J. H. WEIL & CO.
1325 CHERRY ST., PHILADELPHIA, PA.
GURLEY DISTRIBUTORS

FAGEOL heat machines
give you heat instantly where you need it!



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140,000 B.T.U. per hr. (no chimney or flue)
Other models available in 160,000 and 200,000 B.T.U. capacity

HEAT MEN AT WORK—NOT EMPTY SPACES

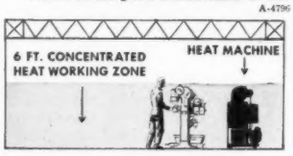
Just snap the switch!

Your Fageol Heat Machine will instantly pour out heat for keeping men warm at work, thawing materials and equipment, drying, treating, curing, heating buildings . . . 1,000 plus one other uses.

By blowing warm air out along the floor or ground, each Heat Machine creates a 6 ft. high heat blanket over areas from 1,600 to 3,000 sq. ft. Unlike ordinary space heaters, they heat where men work. Consequently, operating on No. 1, 2 or 3 fuel oil or kerosene, they save greatly on fuel costs.

Write today for Bulletin L-4782.

A-4796



HEAT THE WORK ZONE
Fageol HEAT MACHINE CO.
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5725 Mt. Elliott Ave. • Detroit 11, Mich.

Highway Men Trained To Use Aerial Photos

Mississippi Uses Intensive Four-Week In-Service School to Offset Rising Costs and Lack of Trained Men

By W. J. CRECINK, JR., Traffic Engineer, Mississippi State Highway Dept.

• THE advantages of aerial-photogrammetric methods for location planning and other highway work have long been recognized by the Mississippi State Highway Department. But though it has applied this relatively new service over the past 19 years, the Department has been unable to exploit all possible benefits because of the shortage of personnel trained in aerial-photogrammetric work.

Prompted by the rising costs of highway construction, the loss of men previously trained in air-photo work, and a shortage of engineers generally, the Department authorized an in-service training school late in 1950. A short course in aerial-photo interpretation, believed to be one of the most extensive of its kind conducted by a highway department, was organized and directed by I. W. Brown, Manager of the Traffic and Planning Division. Mr. Brown had previously been Location Engineer for the Department, and as a nationally recognized authority in aerial photogrammetry had promoted its use for highway work.

Purpose and Scope

The primary purpose of the school was to train personnel from various branches of the Highway Department in the fundamentals of aerial-photo interpretation, stereoscopic work, and its application to highway engineering. In the past, most of the engineering work, especially highway location, entailed costly field surveys. Since some of this work could be done faster, more accurately, and at lower cost with aerial photographs, the Department felt it could operate more efficiently and save taxpayers' money by training its own men in the subject.

A secondary purpose was to impress those taking the course with the advantages of using aerial photographs for certain phases of highway engineering. This was accomplished by having them solve practical problems and make comparative time and cost analyses of doing the same job with and without air photos.

The 4-week course was set up to handle about 20 men. It involved 200 hours or more of classroom work and required that 4 exercises and some 40 practical problems be completed by each student. Short lectures were given as the course progressed, and the instructor was available at all times to answer questions and offer assistance. In addition, a textbook was prepared and a copy given each student.

The men who attended the school were selected from the six construction and maintenance districts of the Department and from the Traffic and Planning Division. Each district engineer was requested to send two men, preferably young graduate engineers with normal vision of both eyes. Preference was to be given to men who knew nothing about stereoscopic study but were willing to learn. The district engineers were cautioned to use judgment in choosing men who would go places, so to speak, in the field of highway engineering. Eight additional men were selected from various sections of the Traffic and Planning Division. The majority came from the Drafting Section, since they were needed for mapping and other work.

To complete the course satisfactorily, each student was required to do the following: Interpretation work of a type usually encountered by highway-location engineers; run out a drainage network and the dividing-ridge drainage areas; compute the watershed areas and structure openings for the cross drains; make stapled index and semi-controlled mosaics suitable to the needs of the highway engineer; do ground-form line sketching and contour mapping.

(Continued on next page)

INCREASE TUNNEL-DRIVING SPEEDS 80% and REDUCE LABOR COSTS 92% with

DEMO-CANON AUTOMATIC GANG DRILL

- Drilling Speeds of 7" to 36" per minute.
- Self Contained Power Plant.
- 28 Fully Automatic Electric Hammer Drills.
- Drills May Be Moved in Vertical or Horizontal Direction.
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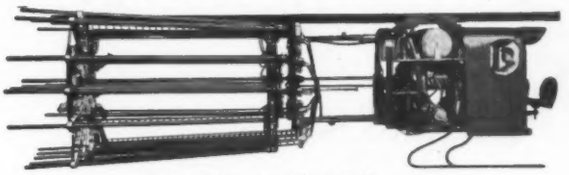
- Push Button Type Controls on one operating Panel.

TWO MEN OPERATE 28 DRILLS



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DEMO-CANON ENGINEERING AND MANUFACTURING CO., INC.
2215 S. Sepulveda Blvd., Los Angeles 25, Calif.

More good aggregate comes out in the wash with high-speed scrubber on TIMKEN® bearings

TO meet the gravel and crushed stone industry's need for a machine which eliminates large amounts of clay and dirt from aggregate with minimum expense, Smith Engineering Works developed this high-speed Super Scrubber. Rapid rotation of the Super Scrubber's drum cascades the gravel with great impact, quickly and thoroughly disintegrating lumps of dirt, clay or objectionable coatings.

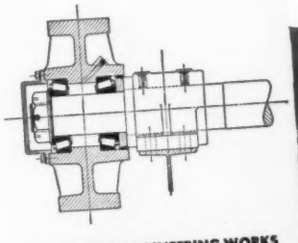
To withstand the heavy shock loads, Smith engineers mounted the trunion rollers and thrust rollers on Timken® tapered roller bearings. Timken bearings are also used in the Dodge-Timken pillow blocks supporting the pulley shaft.

Due to their tapered construction, Timken bearings carry both radial and thrust loads in any combination. They provide extra load-carrying capacity due to line contact between rollers and races. Incredibly smooth surface finish and true rolling motion reduce friction and wear.

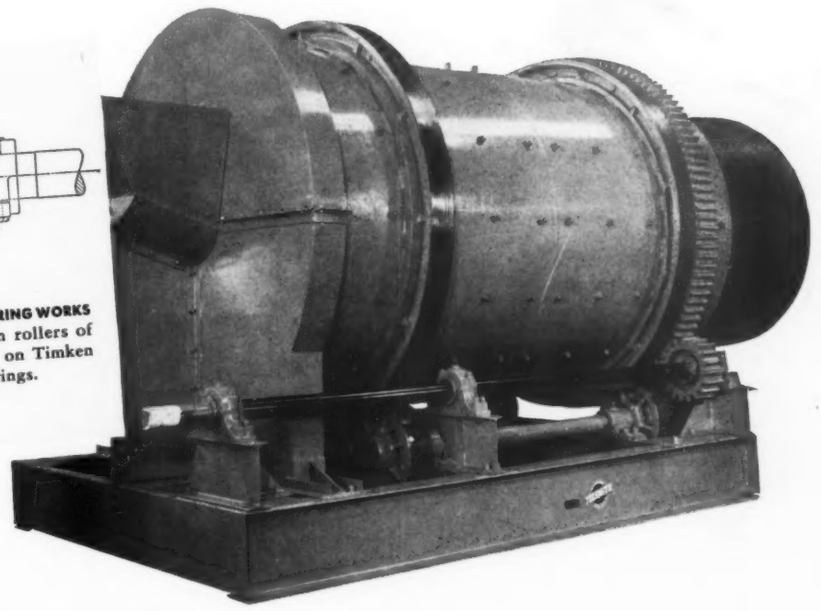
As a result, trunion rollers turn smoothly and effortlessly, high speeds are permitted and the scrubber is kept on the job with minimum time-out for maintenance and repairs. Because Timken bearings hold housings and shafts concentric, they make closures more effective. Dirt, dust and water are kept out; lubricant kept in.

If you're looking for dependable performance in the machines you build or the machines you buy, be sure to specify Timken tapered roller bearings. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **SMITH ENGINEERING WORKS** mounts the trunion rollers of its Super Scrubber on Timken tapered roller bearings.



DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◎ AND THRUST ⊙ LOADS OR ANY COMBINATION

Highway Men Trained To Use Aerial Photos

(Continued from preceding page)

Instructions were divided into seven sections: air-photo interpretation, stereovision, stereoscopic study, drainage-structure development, mosaics and mosaic-making, ground-form line contours, and field altimeter work.

Air-Photo Interpretation: At the beginning of the course, the methods and equipment used in making aerial photographs were explained. It was emphasized that aerial pictures are made to many different scales, the size depending upon the desired use. Five problems involving identification of various objects and features on vertical aerial pictures were given. The difficulties usually encountered in recognizing or understanding specific features or details on the ground, when viewed from 1,000 feet in the air, were discussed. The students were taught that proper interpretation requires a study of four qualities in the prints: tone, size and shape, light and shade, and shadow cast. Completion of the problems required approximately 17 hours of classroom work. During this period the students had become familiar with vertical photos and could identify most objects and features of interest to highway engineers.

Stereovision: Four exercises and four problems in this phase of the work taught the students to see relief with a pair of overlapping photographs—without the aid of a stereoscope. This proved to be the most difficult part of the course for several of the students. The ability to see relief with the unaided eye by means of a pair of overlapping photographs has numerous advantages and enhances the interest in stereoscopic study, but it requires many hours of training. Nearly all of the students were, however, able to solve two drainage-area problems without the aid of an instrument, prior to completion of the course.

Stereoscopic Study: Class demonstrations showed the correct way to set up aerial photographs and adjust the stereoscope. Unfortunately too few people really understand and appreciate how this is done and the benefits to be derived therefrom: gaining the full value of the three-dimensional view and eliminating eyestrain, even when working for long periods of time.

Instruction covered the preliminary steps necessary to stereoscopic study. These included locating the principal point on an aerial photograph, transferring it to an adjacent print in the same flight line by both the visual and stereoscopic methods, locating the base flight line, orienting the prints, and proper adjustment of the stereoscope.

Drainage - Structure Development: This might be called one of the primary phases of the course, because it involved 17 or more problems requiring approximately 100 hours of classroom work. One very interesting problem afforded an opportunity to compare the time required to measure a drainage area with and without the aid of vertical aerial photographs. First, the students were given the aerial pictures of an area involving a drainage structure across a stream known as Cow Creek in Lauderdale County on U. S. 80. They were instructed to run out the drainage network of the watershed area, run out the drainage divide, compute the watershed area, and determine the structure opening required. The time required by the average student to do this work was approximately 4 hours.

Then the students were given the field notes for this same area and were instructed to plot them and make the same computations as required in the problem with the aerial photos. Just to plot the field notes and make these computations required approximately 5 hours by the average student. This impressed the students, since it proved that drainage-structure openings could be computed by using aerial photos in less time than it required to plot the notes from a field survey—to say nothing of the time consumed in making the field survey.

Another feature of aerial photos was brought out in this problem. It so happened that there was an error in the field notes and the traverse would not close. Further field surveys would probably have been necessary to make the traverse close satisfactorily. It was apparent that such repetition of work is never necessary when aerial photos are used. The class was also shown that drainage areas can be obtained from aerial photographs with less possibility of an error and that as a rule the areas are more accurate than those obtained by the usual field-survey methods, since they more closely follow the dividing ridge.

Mosaics and Mosaic Making: This work covered index mosaics, uncontrolled mosaics, and semicontrolled mosaics. The building of the controlled mosaics was explained to the class, but actual construction was not undertaken. It was explained that controlled mosaics are required for more exact mapping needs than are ordinarily encountered in highway-location work, and that if the need arose it is probable that the work would be contracted to a reputable company.

An index mosaic covering approximately half of one county was assembled by each student on large boards. Photographs were made of the index mosaic and given to the students to illustrate the method.

They were also given several problems in building uncontrolled and semicontrolled mosaics. During this instruction, the students were taught the proper way to trim, feather-edge, and mount the prints to make a complete mosaic. The straight-line method of control was used to build the semicontrolled mosaics, and two such mosaics were constructed by each student.

Form-Line Contours: The first problems in this phase involved sketching unknown elevation contour form lines on vertical aerial photographs to show the configuration of the ground surface. Next to seeing stereoscopically without

(Concluded on next page)

Puts a River in its Place

THE BIG RED CHAMP BUILDS UP THE WALL. The International TD-24 is the work champ of the levee and of the world. It's the most powerful crawler tractor made, and the fastest. Also a champ for "handle-ability," with fingertip control for pivot turns, feathered turns, and turns with power on both tracks. All this means it moves more paydirt per day.

the aid of an instrument, this was probably the most difficult work encountered by the students. It was apparent to most that much practice was required to become proficient in the art of drawing ground-form lines.

Following this work the students were given photographs on which spot elevations had been placed. They were required to sketch form-line contours at 5-foot intervals on these prints. Later they were taken into the field with altimeters to determine spot elevations for several vertical aerial photos. Form-line contours were drawn on these prints when the group returned to the office.

Certificates Awarded

At the conclusion of the course, each student was awarded a certificate signifying that he had satisfactorily completed a 4-week course of study in photogrammetric engineering. The certificates bore the department seal and were signed by the Commissioners of the State Highway Department, the Director, the Chief Engineer, and the Instructor.

The writer can testify that the school was a success in every respect, since he labored, along with 18 other students, through the intensive four weeks of training. It is the opinion of everyone connected with the school that it will pay for itself many times over. Without exception, the students expressed a desire to attend another school of this type to advance their knowledge in this field. Tentative plans have been made to hold similar schools each year or as often as it appears necessary to keep a sufficient number of trained personnel in the Department. Plans have also been discussed to offer an advanced course for those holding certificates from this first school.

Richter Is Service Manager

Joseph A. Richter, Jr., recently took over the post of Manager of Service for the Power Tool Division of Henry Disston & Sons, Inc., chain-saw manufacturer. Mr. Richter, formerly Chain Saw Specialist in the company's Market Requirements Division, succeeds Joseph T. Thayer, who is now Sales Engineer for Disston's over-all operation.

Four International crawlers help build wall to save town and mines from Ohio floods

Three times in five years the Ohio River rampaged through Rosiclare, Illinois. Each time it flooded the great fluorspar mines there, the biggest in the world, America's most important source of this vital fluxing agent used in making steel.

J. D. Barter Construction Co. was given the job of taming the river with a $360,000 flood wall. Four out of the five crawler tractors he put on the project are Internationals, and Sam Barter tells why:

"They really do a job, that's why! And they can take it as well as dish it out. We have one TD-18 with 3,000 hours that's never been touched. A TD-24 with 1,500 hours and not one minute's downtime."

Check with your own friends who own International crawlers. And ask your nearest International Industrial Distributor for details on the whole International line. He's always at your call with expert service both in his shop and at your job site. Get the low-down. You'll go International from then on in!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

INTERNATIONAL

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POWER THAT PAYS

Safety Is Good Public Relations

Safety practices may well be the contractor's best single source of good public relations. This is the view of George Schmeltzer, Executive Director of the Pennsylvania Chapter of the Associated General Contractors of America. It was also the theme of his address to the Construction Section of the 1951 National Safety Congress.

Like charity, public good will begins at home—in the good will of your employees. And what better way to secure it, he asked, than by demonstrating your concern for their safety?

Commence your drive for good public relations, he suggested, by initiating a safety movement through your own workers. Use signs and posters—objectively selected, strategically placed, attractively displayed, and frequently changed. Get your safety message across on an individual basis through safety instruction cards which foremen can hand directly to workers, and safety messages enclosed in pay envelopes. Encourage workers to make safety suggestions—acknowledge the suggestions, review them regularly, tell the worker what you are doing with his suggestion, and give him some recognition for suggestions you use.

"Practice safety in your organization, then do yourself full justice in telling your story to the public", advised Mr. Schmeltzer. In safety meetings, for instance, you can reach not only your employees but the public at large. Invite outsiders, including press and radio representatives, to such meetings. Have a photographer on hand. Search out the dramatic elements of safety and play them up in your presentation to newsmen.

Where you make safety awards, provide for their display in store windows and hotel lobbies. When newspapers approach you to buy space, take the opportunity to win good will by putting across a story on your firm's safety record. Promote your firm's participation in civic safety activities. Show and tell the people in your community that your jobs are safe—safe for your workers, and safe for them.

And remember: telling the public means telling not only the community at large that a safe job is under way, but also your suppliers, equipment manufacturers and distributors, architects, engineers, subcontractors, and your customers.

"It may well be", concluded Mr. Schmeltzer, "that safety, as an integral part of your public relations, does not cost you anything; rather, it will be found that safety, in being good public relations, *will pay you.*"

Melting Snow and Ice

A technical circular describing Ice Rem, ice and snow-melting chemical crystals, is announced by Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio. It points out that Ice-Rem has a thawing capacity 30 times greater than salt; that it spreads itself, leaves no messy residue, and will not harm tires, shoes, asphalt surfaces, or concrete. It is available in 10-pound cans, 25-pound pails, and 100-pound fiber drums. Ton lots are shipped in waterproof 100-pound bags.

This literature may be obtained from the company by requesting Bulletin L-4656, or by using the Request Card at page 16. Circle No. 424.

Mississippi-Made Cement

A new cement plant at Brandon, Miss., built by Marquette Cement Mfg. Co., Chicago, Ill., is now producing for the southern market the first cement ever made in Mississippi. The territory served by the new plant includes Mississippi, Louisiana, and southeastern Arkansas.

New Welder's Goggle

A welder's goggle announced by American Optical Co., Southbridge, Mass., features removable and adjustable binder-type leather side shields. It can be adjusted for fit and comfort by loosening the end-piece screws; by removing these screws, the side shields can be taken off for cleaning, sterilizing, or replacing.

The soft leather side shields of the goggle are designed for comfort and for protection against heat, harmful light, and flying particles. The cylinder bridge and reinforcing bar are also covered with leather.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 467.

Hydraulic Ditcher

A heavy-duty hydraulic ditcher with 12, 16, 18, or 20-inch buckets has been developed by Shawnee Mfg. Co., 1947 N. Topeka Ave., Topeka, Kans. The Scout is built to install in approximately 10 minutes on Ford, Ferguson, or Ford-Ferguson tractors. It may be used with a front-end loader or dozer.

The Scout hydraulic ditcher installs in about 10 minutes on Ford, Ferguson, or Ford-Ferguson tractors. It has 12, 16, 18, or 20-inch buckets.

The ditcher swings in a 160-degree arc behind the tractor. It will reach 14 feet behind the digger frame and the bucket can be raised to 10 feet for loading trucks. It digs 9 feet 6 inches with a standard bucket and 10 feet with a hydraulic bucket.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 422.

New Highway Tractor

A heavy-duty highway tractor weighing less than 10,000 pounds and having a gross hauling capacity of 50,000 pounds has been developed by The Autocar Co., Ardmore, Pa. It is powered by the Autocar 447 engine which develops 145 hp. The 501 engine which produces 165 hp is optional.

Standard equipment includes the ET rear axle, 10.00 x 20 tires, and spoke wheels. Optional extras are the driver cab, 10.00 x 22, 11.00 x 20, and 11.00 x 22 tires, auxiliary transmissions, and two-speed rears.

The Model C-65-T has a 142-inch wheelbase; a transmission with helical gears in third, fourth, and fifth speeds; and a pressed steel-alloy frame to which all brackets and cross members are bolted for ready servicing. It has a pressure-type cooling system, a 12-volt 40-amp generator belt-driven from an accessory shaft, two 6-volt 17-plate batteries mounted under the right-hand splash apron, and one 45-gallon step tank on the left-hand rail.

The tractor has air-operated service brakes and a Lipe-Rollway single-plate clutch. It is equipped with sealed-beam headlights, parking lights, a combination tail and stop light, dome light, roof-marker lights, pressure indicator, two rear-view mirrors, sun visor, tools, channel bumper, front fenders, running boards, and toe and floor boards with a rubber mat.

The driver cab is of all-steel design, has a curved windshield, safety glass throughout, and a fully adjustable driver's seat with an arm rest. The cab has a new instrument panel designed for quick reading and including speedometer, air gage, fuel-level gage, ammeter, engine-temperature gage, choke and throttle controls, and light switches.

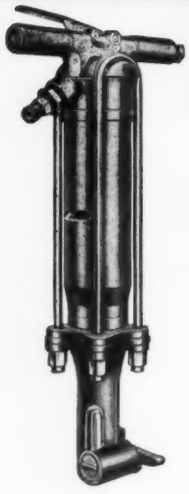
Further information on the Model C-65-T may be secured from the company. Or use the Request Card at page 16. Circle No. 468.

One-Man Soil Compactors

A catalog on the Barco rammer, designed for soil compaction close to walls, culverts, and abutments, and in trenches and ditches, has been prepared by Barco Mfg. Co., 1818 Winnemac Ave., Chicago 40, Ill. It highlights eleven features of the unit, including portability, one-man operation, high compaction, safety, and rugged design. The Barco rammer is completely self-contained and can produce specified compaction (up to 97 per cent) with layers of loose earth fill of 12 to 20 inches. The literature cites various applications of these units on jobs throughout the country. Complete specifications and cutaway drawings are included.

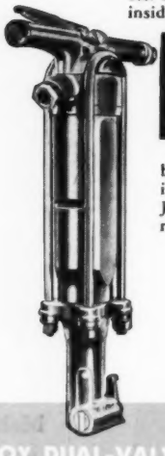
This literature may be obtained from the company by requesting Bulletin 621, or by using the Request Card at page 16. Circle No. 416.

K ... is for the Knockout power in JOY PAVING BREAKERS



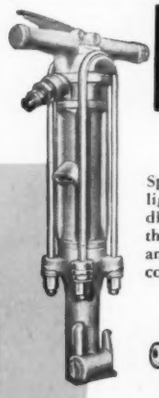
K-89 ... New Super heavyweight

There's real knockout power in this 90 lb. super breaker. The K-89 is designed to speed up demolition of those extra tough-and-heavy reinforced concrete sections, etc. Like all Joy SILVER STREAK Paving Breakers, the K-89 is cadmium-plated inside and out, which prevents rusting, eliminates scoring and aids lubrication.



K-81 ... heavyweight

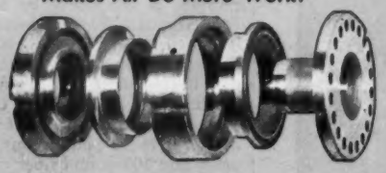
Handles tough demolition jobs economically and efficiently—breaks more concrete because it strikes more and heavier blows, and because it's easier to hold. Outstanding features of the K-81 include the exclusive Joy "Dual Valve," flat-sided cylinder for easy holding against operator's leg, replaceable chuck bushings, "U" type side rods and rugged cam-type retainer.



K-61 ... medium weight

Specially suited for thin-section concrete and other light demolition jobs—hard-hitting and easy-handling like the K-81, but lighter in weight. Many of the parts, such as the chuck housing, chuck bushing and throttle, will fit both the K-61 and K-81—a considerable saving in repair parts stock.

The THRIFTY JOY DUAL-VALVE Makes Air Do More Work!



Get the facts about Joy paving breakers—also Joy compressors, rock drills, wagon drills, core drills, hoists, spaders, trench diggers, etc. See your nearest Joy office or distributor.

K-31 ... lightweight

Only 30 lbs.—a powerful, easy-handling little breaker that's ideal for light demolition and all work where the operator must support the entire weight of the tool, or where footing is not solid, as on scaffolds.

Write for Bulletins, or Consult a Joy Engineer

100 YEARS OF ENGINEERING LEADERSHIP W&O C 3517

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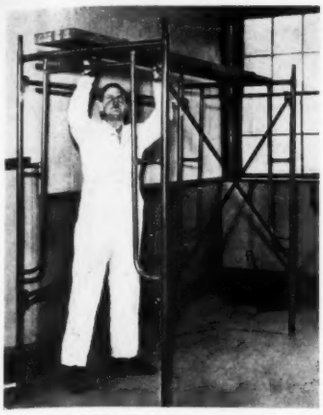


A lightweight walk-through scaffold end frame—particularly for use in the plastering and stucco trades. It is all-steel and all-welded.

Walk-Through Frame For Light Scaffolds

A lightweight walk-through scaffold end frame, designed for use by the plastering and stucco trades, has been placed on the market by Wilson-Albrecht Co., Inc., 3565 Wooddale Ave., Minneapolis 16, Minn. All-steel and all-welded, the tubular end frames have a standard height of 6 feet 6 inches and are available in two widths: 3 and 5 feet. Built-in floating coupling pins and Waco Speedlocks are standard equipment in each frame for safety and ease of erection.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 474.

New Automatic Tool Speeds Nailing Work

An automatic nailing machine for use on subfloors and roof sheathing is now available on a rental basis from National Nu-Matic Nailer, Inc., 2900 Rowena St., Los Angeles 39, Calif. It is operated by compressed air and is designed to nail a minimum of 5,000 square feet per day (1 x 6 on 16-inch centers) at a rate of 100 nails per minute. The nails are automatically fed from a hopper by working the handle up and down.

The machine is guided by a stirrup which the operator wears on his foot. As he moves the machine along to each nailing position, he fires the hammer by a hand trigger. The Nu-Matic nailer is adjustable for left or right-handed, tall or short operators. The nails are countersunk to prevent damage to roof coverings. In the case of nailing subfloors, the laying of a hardwood flooring is not hindered by the protruding nail heads, the company says. The nailer may be used with 6d to 20d common nails. Its use is said to be practical on roofs with a 1 on 3 pitch. The machine requires 12 cubic feet of air with a pressure at 90 pounds.

National rents the equipment, furnishing nailer, air compressor, hose, maintenance, repairs, etc. The contractor may hire a qualified operator recommended by the company and carry him on his own payroll. The company reports that the automatic-powered tool will out-produce hand labor 4 to 1.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 479.

The Nu-Matic nailer races a carpenter to nail down roof sheathing on a new Chrysler plant in Los Angeles. The nailer and its operator kept 4 crews busy laying planks.

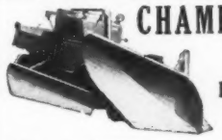
Salem Tool Adds to Plant

A new glass-and-steel building 60 feet wide x 280 feet long is the latest addition to the plant capacity of The Salem Tool Co., Salem, Ohio, manufacturer of McCarthy auger drills and deep-mining equipment. The new building houses 25-ton overhead traveling cranes and the company is installing additional machine and welding equipment to enlarge its capacity.

Antistripping Additive

A bulletin about Kling, an antistripping additive for bituminous materials, has been prepared by Lancaster Chemical Corp., 9 Rockefeller Plaza, New York 20, N. Y. This product is designed to improve the adhesive qualities of asphalt cement and prevent stripping which occurs with hydrophilic aggregates or where pavements are subjected to adverse moisture conditions. The literature outlines the problem of deterioration of bituminous pavements under these conditions and offers Kling as a solution. It highlights the features of the additive and describes in some detail its proper use.

This literature may be obtained from the company by requesting Bulletin No. 5, or by using the Request Card at page 16. Circle No. 446.



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WASHINGTON OFFICE—1101 Vermont Ave. N. W., Washington 5, D. C.

Jet Training Base Is Enlarged

Air Force Photo

The expansion program at Nellis Air Force Base near Las Vegas, Nev., provides new facilities for the training of jet-fighter pilots like this chap shown in an F-84 Thunderjet, readying himself for a practice rocketry and skip-bombing mission. Fighter pilots at Nellis also receive intensive training in dive bombing, panel gunnery, and air-to-air gunnery. When they have completed the course in combat-crew techniques, they are assigned to the Far East.

Parking Apron Is PCC Paving on Compacted Subgrade; Runway Is AC Paving on 6-Inch Rock Base, 10-Inch Subbase

By RAYMOND P. DAY

•IN spite of exasperating delays caused by design changes, a $2,200,000 major expansion has been completed at Nellis Air Force Base near Las Vegas, Nev. Basich Bros. Construction Co. of Los Angeles was the prime contractor, and the Los Angeles District of the Army Corps of Engineers was the supervising agency.

The expansion program called for construction of runways, parking aprons, taxiways, and harmonization ranges and butts to add to facilities built at this base during World War II. Nellis is an advanced training base for the final polishing of jet-fighter pilots, and the new facilities are designed to turn pilots over to the Far Eastern Air Force in the peak of training and condition.

The constant improvement process which military tactics undergo made it necessary for U. S. Air Force commanders at Nellis to modernize and make changes during the first half of work under the contract. Koebig & Koebig, Los Angeles architectural and engineering firm, made all the engineering designs under supervision of the Los Angeles office of the Corps of Engineers. And while the changes were made and sent to the field as quickly as possible, job progress was necessarily somewhat slower that would normally have been the case.

New Paved Areas Necessary

The newest runway is the NE-SW No. 2 strip paved between Stations 8 plus 85 and 73 plus 50, with 1,000 feet of graded overrun at each end. This strip is 150 feet wide. It is set on a highly compacted earth subgrade, covered by 10 inches of imported subbase, 6 inches of graded-rock base course, an asphalt MC-1 tack coat, and 3 inches of asphaltic-concrete pavement made from graded aggregates, select mineral filler, and 85 to 100-penetration asphaltic cement.

A large plane-parking apron of irregular shape was built of portland-cement concrete. It is 2,980 feet long at its maximum point and an average of 625 feet wide. This apron is 10-7-10-inch concrete, laid directly on highly compacted subgrade without an intermediate blanket of subbase.

The harmonization-range slabs, of 14-10-14 concrete, are each 100 x 1,100 feet. They terminate in large earth-and-concrete butts. Their purpose is grim. The total fire power of a plane's cannon and machine-gun equipment is made to converge a certain distance out from the ship for the utmost efficiency in aerial gunnery. While they are on the harmonization-range slabs, planes have their guns adjusted so the total firepower converges in a small space in the heavy butts.

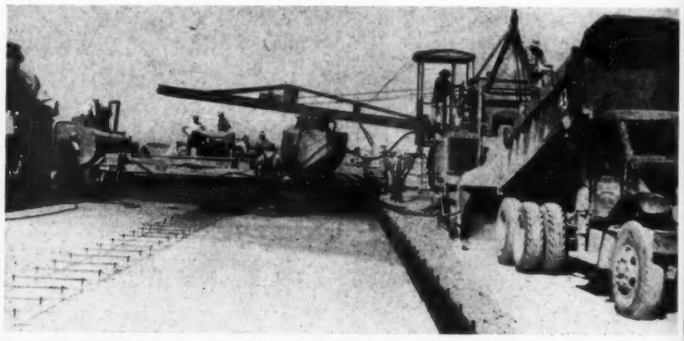
Desert Grading First

Before paving or subbase of any type could be placed, approximately 300,000 cubic yards of grading had to be done to convert the desert from rolling hummocks to finished grade. With an average haul of 2,000 feet, and maximum cuts and fills of 5 feet in sandy soil, grading didn't look like a major problem. Actually, it was one of the worst headaches of the job. For the specifications required unusually high density (95 per cent modified AASHO, under pavements) and it was so hard to deliver that lift thicknesses were altered and soil moisture had to be controlled to fractional percentages from optimum.

Where the native desert underlay portland-cement-concrete paving, specifications called for the subgrade to be compacted 8 inches deep; that is, the top 4 inches was removed, the bottom 4 inches was compacted, and the top 4 was replaced and compacted. In shoulder areas, specifications called for a

(Continued on next page)

The sandy soil these two Tournapulls are loading (one with an HD-20 pusher) gave Basich Bros. trouble—not during grading, but during compaction to specified high densities.



The plane-parking apron Basich built at Nellis is portland-cement concrete laid directly on a highly compacted subgrade. Here concrete goes down between forms.

For the asphaltic-concrete runway, a 10-inch subbase was specified. A Caterpillar No. 12 grader blade-mixed the pit-run rock particles; a Southwest roller compacted them.

This Pioneer crushing-screening plant processed granular-base material for the runway, concrete aggregates, and mineral filler for the hot-mix part of the paving.

minimum of 6 inches of dense compaction, equal to 90 per cent of modified AASHO.

Dodge Construction Co. of Fallon, Nev., helped Basich with part of the grading and hauling. The combined earth-moving fleet was sizable. There were in it 3 Caterpillar D8's with LeTourneau Carryalls, 6 of 15-yard capacity and 4 of 30-yard, 2 Allis-Chalmers HD-20 pusher tractors, an Allis-Chalmers HD-19 and an International TD-18 equipped with dozers, 10 Caterpillar D8's for dozer and auxiliary service, and 6 water tank trucks of 4,000-6,000-gallon capacity. Water is so scarce at Nellis that the contractors used effluent from the sewage-treatment plant —about 600,000 gallons per day.

Processing equipment included two Killefer disks and a heavy Southwest pneumatic compaction roller. The latter machine was used to develop density both in subgrade and subbase.

Grading itself was routine, as equipment simply cut down the hummocks and filled in the low places. However, when a cut section was cleaned to grade, the native earth then had to be compacted over and beyond its natural density to conform to the specifications. Fill sections likewise had to be brought up to grade at specified density. Inevitably the compactive difference between the cut and fill sections made for roughness, so there was always additional compaction and fill to be done over the cut sections to bring the grade up level and uniform.

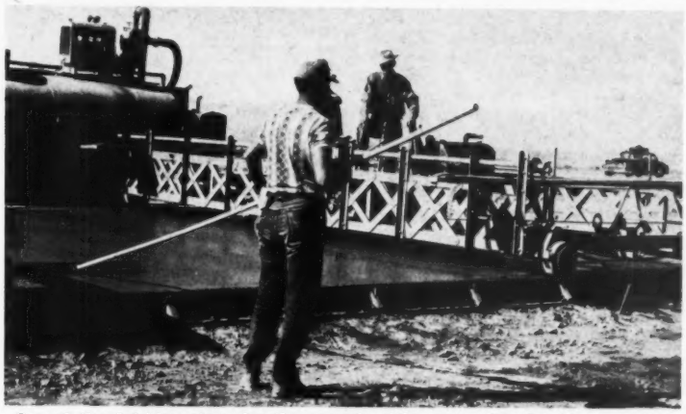
The soil at Nellis is a light, sandy material with a unit dry weight of about 88 pounds per cubic foot. Its optimum moisture content for best compaction is between 12 and 16 per cent. The least difference on either side of optimum has a tremendous effect so far as field processing of such material is concerned. Let a 15 per cent optimum soil accidentally get 16 per cent moisture, and proper compaction is absolutely impossible until the lift is aerated and dried back to 15 per cent.

A disaster of no minor proportions hit the earthwork early in the job when four summer cloudbursts covered the area, converging from four directions. When the storms abated, the office area was covered a foot deep with water. Earthwork which had been finished on the harmonization ranges was partly ruined. It was several days before work was again running at normal speed.

Subbase Rock

The production and installation of flexible subbase was one of the important parts of the project. Specifications for part of this material called for 75 per cent to be crushed angular rock, because the function of the base-course material was to add bearing strength to the natural soil; the interlocking action of angular rock particles gives that effect.

The 10 inch of imported subbase material underneath the graded-rock-base course consists of pit-run well graded rock particles from 3-inch down to No. 200 in size. This material was loaded from the pit by a Northwest Model 6 power shovel, which kept a fleet of ten 7-yard International dump trucks shuttling between the pit and the field. The pit-run material was spread; a Caterpillar No. 12 motor grader road-mixed it with water; then it was laid in lifts only slightly thicker than the 3-inch-maximum particles. Compaction was assured by the Southwest roller.



One of the finishing steps for the concrete slabs was a long-handled troweling between the final finishing and the Flex-Plane machine.

The 6-inch blanket of select granular base was another matter, however. All of this material had to be processed through a crushing and screening plant. Basich Bros. moved in a portable Pioneer plant to crush this material, make the concrete aggregates, and produce mineral filler for the AC mix. During one period of delay when plans were being changed, the portable setup was converted in a few hours and all the tonnage of material for the hot-mix was produced and stockpiled before the changes came through.

Because of a shortage of sand of No. 30 to No. 50 size in the raw pit-run material, a second sand plant had to be set up about 10 miles from the field to produce blending sand for concrete aggregates. This second blending plant was the only outside plant of its type installed; everything else was produced by the portable Pioneer outfit.

It was extremely important to finish the subbase material to neat grade, since in all cases pavement of some type went over the material. Subbase courses were therefore cut and rolled

(Continued on next page)

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Jet Training Base Facilities Enlarged

(Continued from preceding page)

to neat grades as established by surveyors' bluetops. In the case of subgrade under concrete pavement, the same method was followed.

Steel Forms Used

Blaw-Knox 8 and 9-inch steel forms in 10-foot sections were used to hold the edges of the portland-cement concrete. There were approximately 18,000 linear feet of forms on the job, or enough to keep set out at least 2 or 3 days ahead of the pavers. The forms were spaced 25 feet apart to make standard-width airport lanes. A crew of about 20 men set, aligned, tamped, and moved the form sections. Form pins were driven by a pneumatic hammer powered by a small 105-foot compressor.

Fine-grading was done by a Buckeye machine, and disposal was no particular problem since there wasn't much excess after grading equipment finished cutting to bluetops. After the Buckeye Finegrader finished its work, a Buffalo-Springfield 3-wheel steel roller weighing 15 tons put on the final compaction. The finish grade was checked across the forms at 25-foot intervals with a string line and rule.

While pavement joints are of several types, one type—the expansion joint—is conspicuous by its absence. There are only 4 expansion joints in the entire job. Contraction joints are provided every 25 feet. Installed by a Flex-Plane machine, they consist of asbestos strip material specially designed to resist the extreme temperatures from jet blasts.

Open contraction joints, which were placed transversely, were also filled with fuel-resistant and heat-resistant material. Construction joints consist of $\frac{5}{8}$ x 30 steel dowel bars. Keys between lanes were formed by bolting the key forms onto the sides of the Blaw-Knox forms.

Two Pavers Place Concrete

Two pavers, a MultiFoote 34-E single-drum and a Rex 34-E double-drum machine, were used simultaneously to make speed with the placement of concrete. Wherever possible, the pavers were spotted outside the forms on subgrade. When alternate strips had to be paved, the machines worked on planked surfaces on the previously poured concrete strips.

The basic concrete mix was designed to give 550 pounds of flexural strength in 14 days, and 3,480 pounds of compressive strength in the same period. It had a basic water-cement ratio of 5.5. Ingredients per sack consisted of 94 pounds of cement, 125 pounds of sand, 205 pounds of aggregate from No. 4 to 1¼-inch, 210 pounds of aggregate from 1¼ to 2¾-inch, and 45.82 pounds of water. A 1⅓-yard batch was used.

Trucks containing the dry batches came in from a Johnson manual plant on the site, and dumped their batches to the paver skips. Each paver towed its own mix-water trailer, which was supplied from the Nellis base supply. Each paver had its own pump to deliver mixing water from the transfer tank, and the operators added enough to put the fresh concrete out of the machines at an average slump of about 2 inches.

Commander at Nellis Air Force Base is Colonel Avelin Paul Tacon, Jr.

With the exception of a little reinforcement around the edges of a few slabs, the pavement is plain. No time had to be lost in placing this material, therefore, and the entire thickness could go down in one pass. One paver laid full-thickness pavement as wide as possible, and the other paver rounded out its part of the slab.

Mechanical manipulation of concrete, designed to spread and consolidate it to final grade, was done by a train of concrete equipment. In order, there was a Jaeger-Lakewood spreader, a Blaw-Knox finisher, manual long-handled floats, a Flex-Plane joint machine, and more hand finishing. A Jackson tube vibrator mounted on the Jaeger-Lakewood spreader helped to consolidate the mix as the spreader distributed it evenly between the forms. The final finish was made with a burlap drag to roughen the surface slightly.

The concrete was cured by the application of membrane curing solution. If possible, forms from a day's work were cleaned and moved ahead the next day. A small International TD-14 tractor with a side boom and hoist pulled the sections and loaded them to the bed of an International flat-rack truck, which carried them ahead to the next point of use.

Construction of big airport parking areas always entails the movement of heavy paving equipment from place to place. On this project a Tournacrane did this work. The rubber tires were easy on compacted grades, and the machine had plenty of power to lift the concrete spreader and like equipment as it was needed.

The batch plant for the project was a Johnson manual machine, set up on

(Concluded on next page)

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the field. Aggregates were made locally and, as has been previously mentioned, sand came from two sources. It was blended at the plant through two hoppers which delivered the right proportion to each batch of concrete.

Basich Bros. made quite an extensive cost analysis of cement delivery and found that the material could be trucked to the batch plant for the same amount which would be required to ship it by rail to a Las Vegas unloading point. The truck method of delivery was therefore selected, and bulk cement was hauled from the Southwest Portland plant near Victorville, Calif. A 2,000-barrel Johnson storage silo was available at the field, along with about 450 barrels inside the main batch plant.

The dry-batched material was sent out to the pavers over a haul road polished smooth each day by motor graders.

Hot-Mix

When Nellis Base was visited, the placement of hot-mix was still a future work item. Orders had been placed for delivery of hot-mix equipment, however, and President N. L. Basich had his paving scheme well in mind.

It called for a standard 3,000-pound hot-mix plant and a Barber-Greene finisher. No difficulty rolling the pavement was expected, since by the time asphaltic concrete was to go in, the weather would be cool. Summer temperatures at Nellis are often so high that a roller lags a mile or more behind the laydown machines in the middle of the day. Rollers can stay much closer in the winter, and heavier rollers can be used earlier.

Personnel

Field operations for Basich were under the supervision of Roy H. Richards, Superintendent, and Homer Mitchell, Project Engineer. Elmer Kitley was Master Mechanic and Jack Farrell was Office Manager.

For Koebig & Koebig, Tom Heatfield was Resident Engineer. The Army Corps of Engineers was represented by Bing Hedrick and Gene Ankrum.

Air-Gun Concrete Placement

An 8-page folder describing permanent pneumatic placement of concrete for pipe joining, block buildings, restoration of damaged surfaces, and waterproofing is offered by Ben Nicholson Co., 13505 Interurban Ave., S., Seattle 88, Wash. The Groutweld gun operates from a 60-cfm compressor and holds 3½ cubic feet of material. It can be transported by pickup truck and moved around the job by one man. It is shipped ready to use.

On-the-job photographs illustrate applications of this unit. User testimonials in the bulletin indicate that Groutweld pipe joints reduce infiltration to a fraction of the normally permissible amounts. A full description is given of the method of constructing small-size buildings using blocks laid up without mortar. After all the blocks are in place, the Groutweld machine shoots a concrete coating ⅜ inch thick on both inner and outer walls. Complete data are given on the mixers, working time, and material used per square yard.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 469.

Bucket-Type Earth Drill

A folder describing the features of the new Calweld earth drill, Model 150 A, has been issued by The California Welding & Blacksmith Shop, Inc., 7222 E. Slauson Ave., Los Angeles 22, Calif. The bucket drill can be used to dig caisson pier holes, prebore concrete piles, drill water wells and cesspools, explore mineral deposits, and test soil conditions. The booklet gives specifications and explains how the drill is used in heavy-duty construction.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 505.

A new catwalk and mesh screen guards mark Lippmann Engineering Works' new Wash-More portable washing plant. Its capacity runs as high as 80 cubic yards an hour. For more information circle No. 462 on the red Request Card at page 16.

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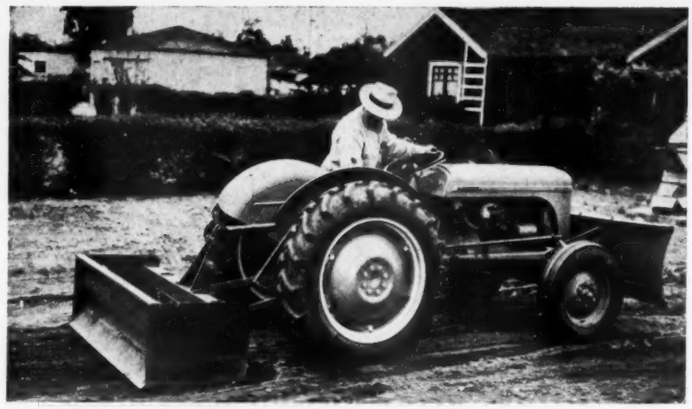
Small Scraper With Hydraulic Control

A scraper with a bucket capacity of approximately ¾ yard and a cutting and backfilling blade 5 feet 6 inches wide has been announced by The Tractor Sales Corp., 1409 Santa Fe Ave., Los Angeles 21, Calif.

The McGee scraper weighs 450 pounds. Its principal features include cradle action and hydraulic upper-link control of the scraping angle. Without dismounting from the tractor, the operator can adjust the tilt of the scraper for backfilling, scarifying, and grading (both rough and finish).

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 473.



The McGee scraper features hydraulic control of its scraping angle. Bucket capacity is ¾ yard; the backfill blade is 5½ feet wide.

Welding-Design Manual

A revised and enlarged edition of "Manual of Welding Design and Engineering" has been announced by Eutectic Welding Alloys Corp. Enlarged to 72 pages, the new edition contains 62 new photographs and 132 new drawings, together with the latest data and how-to-do-it articles.

This "pocket library" of welding data gives detailed information on over 100 different Eutectic Low Temperature Welding Alloys for use on cast iron, steel, copper, brass, bronze, aluminum, die cast, stainless nickel, Monel, magnesium, etc., and covers all heating methods: torch, arc, furnace, inert arc, induction, etc. Illustrations include application drawings; weld diagrams; and tables of melting temperatures, tensile strengths, corrosion factors, etc.

The 72-page book is available without charge upon request to Eutectic Welding Alloys Corp., Dept. F, 172nd St. and Northern Blvd., Flushing, New York 58, N. Y. Or use the Request Card at page 16. Circle No. 480.

Wanamaker Resigns As Turnpike Director

General W. W. Wanamaker resigned last December from his post as Executive Director of the New Jersey Turnpike Authority. Thomas R. Lowrie, Director of Real Estate for the Authority, has been named Acting Executive Director.

General Wanamaker resigned to accept the post of Chief Engineer of the Orinoco Mining Co. In announcing his resignation, Paul L. Troast, Authority Chairman, spoke highly of his engineering skill, experience, and executive ability.

Mr. Lowrie has been associated with the Authority since May, 1949, and from that time until his present appointment he was in charge of the Authority's real-estate operations, supervising the acquisition of property for the right-of-way for its 118-mile highway. This task involved more than 3,700 parcels of property with a value of approximately $17,500,000.

Electric-Plant Price List

A price list covering lines of air-cooled, radiator-cooled, and marine water-cooled electric generating plants has been released by Universal Motor Co., 428 Universal Drive, Oshkosh, Wis. It is dated November 1, 1951, and carries prices of new models recently included in the Universal line of light plants.

The complete line includes gasoline models from 250 to 25,000 watts and diesel models from 2,000 to 36,000 watts.

This list may be obtained from the company by requesting Form SE-3, or by using the Request Card at page 16. Circle No. 438.

WIRE ROPE

You'll save time and cut costs with ROEBLING rope

FAST OPERATION AND DOLLAR SAVINGS are more important than ever in excavating and construction. One sure way to save time and expense is to specify Roebling Preformed "Blue Center" Steel Wire Rope. Here's a tough rope that stands up under shocks, strains and high speeds. Its preforming always assures maximum handling ease, better spooling and much smoother performance on the job.

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Wedge clip

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20 VESEY ST., NEW YORK 7, N. Y.

The Limb-Lopper hand pruning saw is air-powered and weighs 5½ pounds.

Air-Powered Pruner

A lightweight air-powered hand pruning saw with a cutting capacity to 6 inches has been announced by Miller-Robinson Co., 7021 Avalon Blvd., Los Angeles 3, Calif. The Limb-Lopper weighs 5½ pounds. Standard length is 36 inches but several lengths are available depending upon the service required. The saw is easy to handle, operates at 1,500 strokes per minute, and will not buck, chatter, or bind, the manufacturer claims. Blades are easily removed for sharpening when necessary, and several types are available.

The saw can be powered by any self-contained power air source or power-takeoff compressor with capacities from 8 to 30 cfm, depending upon the units supplied. Complete compressor units, hose fittings, and accessories are also available from the company.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 470.

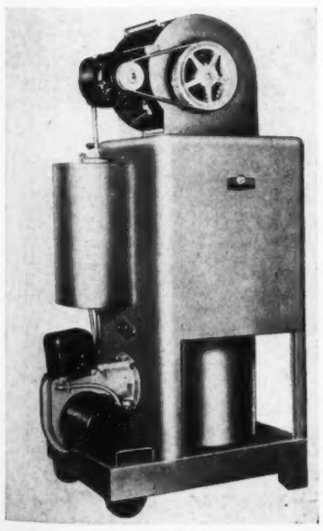
New Heating Machine

A 140,000-Btu heat machine for indoor or outdoor use is announced by Fageol Heat Machine Co., 5725 Mt. Elliott Ave., Detroit 11, Mich. The Model PW-140 is said to employ an entirely new principle of forced-air circulation and to heat men at work —not empty spaces.

By blowing warm air out of its base along the floor, it creates a 6-foot-high heat blanket to eliminate the necessity for heating vast overhead areas in order to keep workers comfortably warm. This concentration of heat is said to reduce heating costs by as much as 90 per cent. The Model PW-140 sprays heat from all sides across the floor, and can therefore be located in the center of large areas. It is designed to heat workers comfortably in areas up to 3,000 square feet of confined space or 1,600 square feet of open space.

The heat machine burns regular furnace-type fuel oil of No. 3 or lighter grades, or kerosene. It requires no flue or chimney. It is self-contained, has a 6-gallon fuel tank attached, and is equipped with wheels for easy portability as a hand truck. Dimensions are 21 x 33 x 58 inches high. The machine weighs 245 pounds. The burner is a gun type, pressure-atomizing. The machine can be started or stopped by snapping a switch. A 200,000-Btu model, PW-200, is also available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 401.



By a new principle of forced-air circulation the Fageol 140,000-Btu heat machine is said to heat men at work —not empty space.

Lansing Appoints Barry

Joseph M. Barry is now Branch Manager in Charlestown, Mass., for Lansing Co., Lansing, Mich. He has been engaged in the construction-machinery and material-handling business since 1919, and in his new post he will be responsible for Lansing's line of concrete mixers, concrete carts, wheelbarrows, mortar boxes and pans, and its two and four-wheel warehouse trucks, wheels and casters, hand carts and skids.

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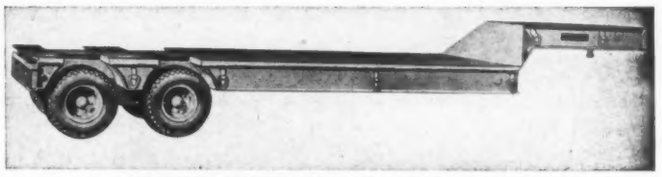

CARGO CARRIER MODEL GPX (Semi) with Tandem Axles

PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and sidewise wheel accommodation to irregularities in the road. Use of full width tubular forged, heat treated axles with CAMBER.

FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

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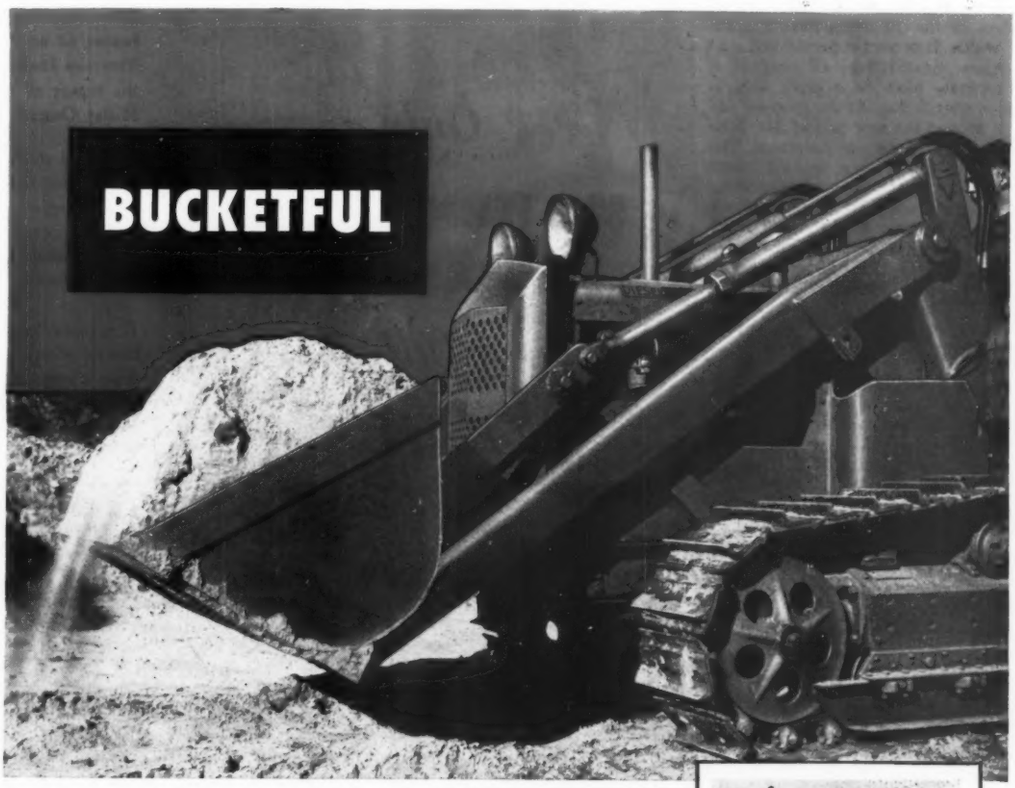


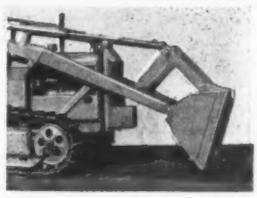
of Cost-Cutting Features

When it comes to cutting loading costs... stepping up profits, the Oliver Model "B" Crawler and Ware Loader is "loaded" with *plus* features.

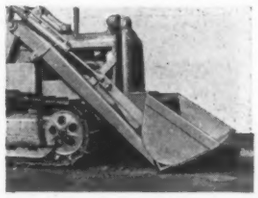
Take the hydraulically controlled bucket, for example. 110° bucket rotation and 28° "tilt back" give you a full bucket every time. "Breaking out" action is 3 times the lifting effort of the loader... a particularly important advantage when loading out hard-packed material or for stripping operations. Bucket level is automatically maintained when lifting load, preventing wasteful spillage. You can control speed of discharge... fast or slow, easily and gently. And, even with the "tilt back" action, you still have a 32° (from vertical) dump angle... a control range no other loader can match. You get bigger loads... *faster!*

The Oliver-Ware "B" loader was designed and built exclusively for Oliver Model "B" tractors. Its ideal fit with the tractor eliminates unneeded dead weight and assures maximum stability for the entire unit. The Oliver semi-rigid axle allows limited oscillation of the track, eliminating the possibility of track-frame distortion. A hydraulic shock absorber smooths out pressure surges... prevents damage to loader and tractor parts.

For complete information on how the Oliver-Ware Model "B" tractor loader can cut costs for you, see or write your Oliver Industrial Distributor.



Plenty of power, plus the wide angle of bucket rotation, assures faster, more positive digging. 28° "roll back" assures maximum break-out action for a full bucket every time.



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Ten Miles Turned Into Dual Highway

New 24-foot Concrete Pavement Is Laid on New Location; Existing Pavement Is Retained to Provide Dual Road

• THE Ohio Department of Highways is improving a 10-mile stretch of transcontinental U. S. 40 by building a 24-foot reinforced-concrete pavement to parallel the existing one. This new dual highway begins at Lafayette in Madison County, which is the present terminus of the 22-mile dual highway extending west from Columbus. It continues as far as Vienna in Clark County. When the present construction is complete, the heavily traveled 43-mile section of U. S. 40 between Springfield and Columbus will be dual highway the entire distance.

The existing pavement is generally 20 or 22 feet in width, with a small portion of the 10 miles having a 24-foot width. It is part concrete and part macadam construction; all sections of the concrete have been given a bituminous resurfacing. At the easterly end of the project the new half of the highway is north of the old pavement. The new alignment crosses the old about midway of the job, and continues south of it to the western end. In one location the improvement has a four-lane dual-roadway section where it bypasses the town of Summerford on the south. The town of Brighton is also bypassed, but only with the regular two-lane construction; the existing highway through the town will function as one half of the new improvement.

A typical cross section of the dual highway has a center grassy mall 39 feet wide between the edges of the paralleling pavements. This median strip is depressed, with the slopes draining to the shallow ditch and pipe located in the middle. The new 24-foot reinforced-concrete pavement has a 9-inch uniform depth; the pitch from the center-line crown is at the rate of $\frac{3}{16}$ inch to the foot. Shoulders 10 feet wide flanking the pavement have a slope to the outside edge of 1 inch to the foot. Sideslopes are 4 to 1 where the cuts and fills are 10 feet and under; where the depth is over 10 feet the slopes are 2 to 1. Over this middle-Ohio flat terrain, the cuts and fills were fairly shallow and the slopes are mostly 4 to 1. The entire roadway is seeded out to the right-of-way lines.

Grading and Structures

Construction got under way in August, 1950, after the Ohio Department of Highways awarded a contract for the 10-mile project to the DeSalvo Construction Co. of Cincinnati, Ohio, on its low bid of $1,300,567. Three bridges and culvert work were subsequently sublet to Visintine & Co. of Columbus, Ohio. Grading and drainage work practically came to a halt late that fall because of bad weather, but the bridge operations continued through the winter. Dirt-moving and pipe laying were resumed last spring, and by June 11 were far enough advanced for

(Continued on next page)

C. & E. M. Photo

A Thor hammer drives form pins on the DeSalvo concrete-paving job. A Worthington compressor mounted on a Mack truck powers it.

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successfully drove these long piles

The contractor's problem? To drive 14" steel H beams, 60 to 130 feet in length, to refusal on this Veterans Hospital job in New York City. Here's the report of Mr. Herman C. Miller of the I. B. Miller Contracting Corporation:

"We had difficulty in driving these long lengths with other hammers. So we tried a McKiernan-Terry Single-Acting S-8 Hammer. Its performance was so successful that piles driven to refusal with other hammers in some instances went 20 feet deeper when re-driven with the S-8."

This powerful performance is typical of the entire line of McKiernan-Terry hammers. Find out how these hammers can help you handle the toughest pile-driving jobs. Bulletin contains complete data on 16 sizes of hammers and 2 sizes of extractors. Write for your copy.

A McKiernan-Terry Single-Acting S-8 Pile Hammer punching down long piles for the new Veterans Hospital, 23rd St. and First Ave., New York City, being constructed under the direction of the Corps of Engineers, New York District. Alfred Hopkins & Associates, Architects; Severud-Elstad-Kreuger, Consulting Engineers.

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McKIERNAN TERRY

MK 312

paving to begin. The job is expected to be completed early this year.

Earthwork totaled about 340,000 cubic yards, of which approximately two-thirds was roadway excavation and the other one-third was borrow. The existing highway will be disturbed in only four locations: once at the eastern end where a connection is made to the existing dual highway near Lafayette, and three times where grades are reduced to improve sight distances. This work affecting the existing highway will not be begun until the new pavement is completed and opened to traffic.

Caterpillar equipment was used for practically all the dirt-moving, the DeSalvo fleet of machinery including a D8 crawler tractor with a 12-yard scraper; 5 DW10's with 10-yard scrapers; and 7 DW10's with 12-yard bottom-dump wagons. For dozer work there were 4 D7's and 2 D8's, while the grade was shaped by 3 Caterpillar motor graders. The tractors also pulled 5 twin sets of tamping rollers to compact the fill lifts. Underdrains, extending over about half the job, were laid in trenches cut by a Buckeye trencher. The 6-inch pipe parallels the pavement, and was placed chiefly in the strata of poorer soils. Altogether, the drainage pipe, from 6 to 60-inch in diameter, totals approximately 39,000 linear feet.

Special Subgrade for Pavement

Classified embankment, SS-5 in the highway department specifications, was laid on top of the subgrade as a foundation course for the pavement. It has a compacted depth of 6 inches, and usually extends one foot beyond the pavement on each side. The material is mostly impervious sand-gravel that was obtained from two local pits, one at each end of the job. It was dug out by a dragline and shovel, and hauled to the roadway in the Caterpillar bottom-dump wagons. Dozers spread the material, which was then compacted by a dual tamping roller pulled by a Koehring heavy-duty Trail-Dump rubber-tired tractor that was weighted down at the rear, and by a 3-wheel 10-ton roller. The final shaping was done by motor graders.

Forms for the 12-foot lanes of concrete pavement were laid on this embankment course. The contractor provided 6,000 linear feet of Blaw-Knox and Heltzel forms that had a wooden 1-inch key bolted to their sides at mid-depth. At least 1,000 feet of forms and prepared grade were always maintained ahead of the paving operations. Form pins were driven by a Thor pneumatic hammer powered by a Worthington air compressor mounted on a Mack truck. Excess dirt between the forms was then removed by an RB Finegrader that pulled itself along on cables attached to the forms ahead. It had in tow a scratch template that checked the exact grade. Two men with shovels followed along behind to skim off any high spots.

A Buffalo-Springfield 5-ton tandem roller gave the foundation course a final rolling before the transverse contraction joints were installed. They are 100 feet apart, with expansion joints only at structures and at the two ends of the project. Bethlehem Steel Co. joint assemblies were used, consisting

C. & E. M. Photo

This is the Blaw-Knox batch plant that serviced the Ohio improvement—the cement bin in the foreground, the aggregate bin behind it.

of a ⅛-inch steel plate, 5⅜ inches deep, extending across the 12-foot lanes. The plate comes to within ½ inch of the top of the slab, and its bottom is 1⅜ inches below the center of the dowels which are 1 x 18-inch on 12-inch centers. These transverse plates were capped with a metal channel that was removed after the mechanical finishing machines had passed over the surface of the concrete.

In addition to the keyway in the forms the adjoining 12-foot lanes of concrete were tied together with 9/16-inch diameter hook bolts spaced on 30-inch centers. They extended 7 inches into each lane, and were fitted through holes burned in the sides of the steel forms.

Batch Plant

A concrete batch plant was set up just north of the existing highway, midway of the project. It consisted of a Blaw-Knox 100-ton 3-compartment aggregate bin, and a Blaw-Knox cement bin with a storage capacity of 800 barrels in a 400-barrel silo and a 400-barrel hopper bin. Universal Atlas air-entraining cement from a plant at Fairborn, Ohio, was delivered to the job in enclosed trucks, dumped into a hopper, and discharged into either bin or silo by means of a worm conveyor

(Continued on next page)

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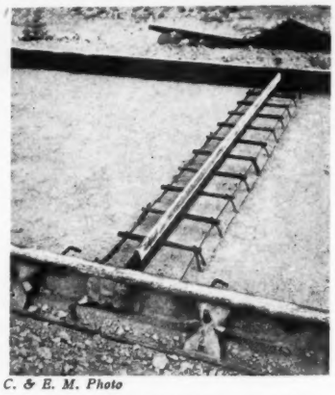
MANSFIELD — LOUISIANA

Ten Miles Turned Into Dual Highway

(*Continued from preceding page*)

and elevator. To maintain 4 per cent air in the concrete, Vinsol resin was sometimes added to the batches at the paver.

Sand and gravel aggregate for the concrete came from two sources—the West Jefferson Sand & Gravel Co. of London, Ohio, and Malowney, Inc., of Springfield, Ohio—and was delivered to the plant by truck. The trucks end-dumped the material from a ramp into a receiving hopper with a feeder at the outlet that directed the sand and two sizes of gravel onto a Barber-Greene 24-inch conveyor belt 110 feet long. The high end of this belt was supported on a steel frame. By swinging the free end of the belt along this frame the different grades of aggregate were discharged onto three material stockpiles. A Caterpillar D315 diesel-electric unit supplied power to the motors operating



C. & E. M. Photo

Assemblies for transverse contraction joints were Bethlehem. Hook bolts go through the Heltzel forms for the longitudinal joint.

the aggregate conveyor and the cement plant.

From the aggregate stockpiles the sand and gravel were fed to the storage bin by a Northwest crane equipped with a 35-foot boom and an Owen ¾-yard clamshell bucket. As many as nine trucks, carrying three batches each, hauled the materials to the paver when the maximum haul distance was 5 miles. As the haul distance lessened, the number of trucks was decreased. The plant layout permitted the trucks to drive under both the aggregate and cement bins in that order when loading. The cement was carried in separate metal containers to prevent loss from the wind while the trucks were in transit.

The Mix

A 9-bag batch was used, yielding 37.4 cubic feet of concrete. The weights of a typical batch, including the moisture in the aggregate, were as follows:

Cement	846 lbs.
Sand	1,372 lbs.
No. 4 aggregate	1,103 lbs.
No. 3 aggregate	1,668 lbs.
Water (5.2 gallons per bag)	390 lbs.
Total	5,379 lbs.

The gradation of the sand and two sizes of gravel fell within these limits:

Sieve Size	Per Cent Passing No. 3	No. 4	Sand
2-inch	100	....	....
1½-inch	80-100	....	....
1-inch	20-60	100	....
¾-inch	0-20	80-100	....
½-inch	....	20-60	....
⅜-inch	0-5	5-30	100
No. 4	....	0-5	95-100
No. 8	....	....	70-95
No. 16	....	....	45-80
No. 30	....	....	25-60
No. 50	....	....	10-30
No. 100	....	....	1-10

Water for the concrete was pumped from Deer Creek, near the middle of the job, into a 2,000-gallon tank mounted on a Mack truck. This unit supplied a 1,500-gallon tank, mounted on a low-bed trailer, that was pulled along by the Rex 34-E dual-drum paver. A Jaeger 2-inch pump on the trailer transferred the water from the supplying truck, while the pump on the paver made the final move from tank-trailer to paver through a 2-inch hose.

Paving Operations

The free ends of the transverse dowels were greased, the forms oiled, and the grade wet down in preparation for the paving. Batches were mixed 1¼ minutes in the Rex 34-E paver working outside the forms and equipped with a 35-foot boom. As the concrete was discharged, it was struck off to a depth of 4 inches below the forms by a Jaeger spreader, and the mesh reinforcing, supplied by Bethlehem Steel Co., was placed and covered with concrete. Following the spreader came a Jaeger-Lakewood dual-screed finishing machine, at the front end of which were two Jackson vibrators, one on each side, for vibrating the concrete along the forms. Behind that was a Koehring Longitudinal Finisher. Contraction and longitudinal joints were edged, and the surface of the concrete was given a burlap drag finish.

Curing was effected with a membrane compound supplied by the Marietta Paint & Color Co. of Marietta, Ohio. It was applied by a DeVilbiss sprayer mounted on a Heltzel Flexible Road Joint machine. Both the transverse and longitudinal joints between the lanes were poured with Flintkote rubber compound, heated first in a White heater, then transferred to a Hecker smaller-sized heater for pouring. Forms were picked up by a truck crane, loaded onto trucks, and moved

(*Concluded on next page*)

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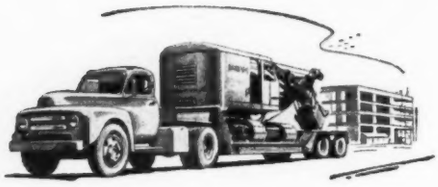

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ahead.

The contractor averaged between 1,800 and 2,000 linear feet of 12-foot concrete pavement in a 10-hour day.

Quantities and Personnel

The major items in the 10-mile contract included the following:

Roadway excavation	230,000 cu. yds.
Borrow excavation	110,000 cu. yds.
Classified embankment	35,000 cu. yds.
Reinforced-concrete pavement	171,000 sq. yds.
Seeding	539,000 sq. yds.
Drainage pipe, 6 to 60-inch	39,000 lin. ft.

The employees of both prime and subcontractors totaled 130 at the peak of construction. The DeSalvo Construction Co. was represented on the project by Russell and Anthony DeSalvo.

For the Ohio Department of Highways, Hubert Stritmatter was Resident Engineer. The Department is headed by T. J. Kauer, Director. L. F. Schaeublin is Assistant Director and Chief Engineer, while Howard R. Craig is Chief Engineer of the Bureau of Construction. E. L. Sheley is Division Engineer.

SASHO Tenth Meeting

Discreet optimism was the keynote of Kentucky State Highway Engineer Dwight H. Bray's annual address to the Southeastern Association of State Highway Officials, of which he was President for 1951. Mr. Bray, speaking at SASHO's Tenth Meeting which took place at Charleston, N. C., December 5-7, 1951, referred to a return of "good-roads thinking", largely attributable to the automotive industry's public-relations campaign. However, as against this trend, he said, must be set the difficulties that highway-improvement programs are meeting—shortages both of highway engineers and of steel. As for steel, Mr. Bray ventured the personal opinion that "barring a full-scale war, I think that we will have all the highway steel we need by 1953."

National civil defense was a major topic at the meeting. Speakers emphasized that highways and highway personnel and equipment are vital to an effective emergency program, with its dependence on efficient transportation. The need for more public awareness of and interest in actual problems besetting the nation's highway-improvement program was another question of general interest, while various technical problems formed the subject of individual reports and panel discussions.

Resolutions adopted by the Association included one endorsing the stand of the American Association of State Highway Officials in making various recommendations for "relief from conditions now seriously handicapping the proper construction, maintenance, and administration of our highways"; and another addressed to state governments asking for studies and action in the various states on increased salary ranges, adequate retirement plans, and merit systems to encourage capable engineers to make careers in highway work.

SASHO is composed of highway officials of twelve southeastern states. A. O. Neiser, Kentucky Director of Design, served as Secretary-Treasurer of the organization during 1951. New officers for 1952 who were elected at the convention include: President, Claude R. McMillan, South Carolina Chief Highway Commissioner, who served as Vice President during 1951; Vice President, R. B. Richardson, Louisiana Director of Highways; Secretary-Treasurer, J. K. Crowson, who is Secretary-Treasurer of the South Carolina Department of Highways.

Social events during the three-day convention included the Annual Banquet at which awards of merit were presented to past presidents, two informal receptions, a luncheon, a dinner, a "South Carolina Night", and two dances.

Brochure on Spray Equipment

A 16-page rotogravure brochure describes the complete line of spray equipment made by Spray Painting Equipment Division, DeVilbiss Co., Toledo 1, Ohio. Though the bulletin is devoted principally to industrial and commercial applications, many photographs show the uses of DeVilbiss equipment in the construction industry, painting metals, wood, and other materials.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 471.

How to Use a Welding Torch

A 24-page booklet, "Here's How to Operate a National Welding or Cutting Outfit", has been prepared by National Welding Equipment Co., 218 Fremont St., San Francisco 5, Calif. It outlines and illustrates the steps to take in setting up an outfit and lighting a torch properly and safely.

In addition to the step-by-step illustrated instructions, the booklet provides welding-nozzle and cutting-tip selector charts, plus a complete list of safety suggestions designed to reduce hazards on the job. The directions are written in clear easy-to-understand language.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 483.

Electrical-Equipment Plant

A 40-page photo booklet shows facilities and production operations in the plant of Hobart Bros. Co., Hobart Square, Troy, Ohio, producer of electrical and welding equipment for the construction industry.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 411.

STA-VIS STARTING FLUID

Auxiliary Fuel for Quick Starting of Diesel Engines

- Prolongs battery life
- Sure fire starts
- Saves time and money
- Economical—price reduced

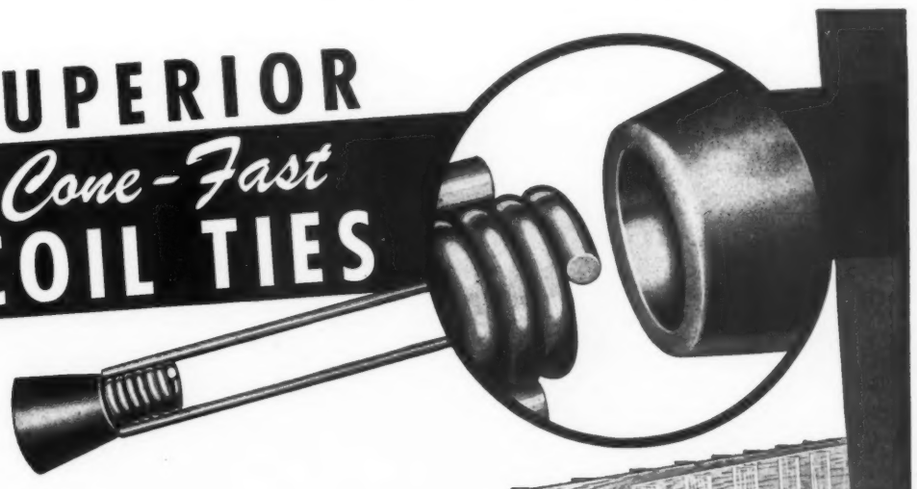
LARGE 24-OUNCE CAN ONLY $1.20

25-can case shipped prepaid

Distributor territories open—Write for information

STA-VIS OIL COMPANY St. Paul 2, Minn.

SUPERIOR *Cone-Fast* COIL TIES

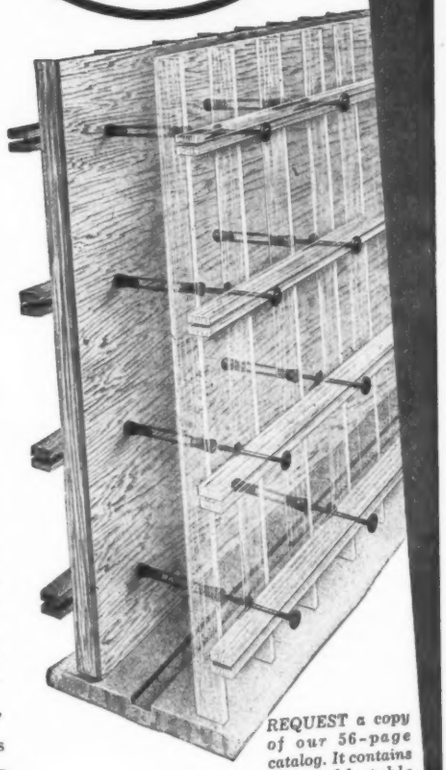


YOU CAN CUT YOUR FORM COSTS!

Because the cost of form work is a prime factor in the total cost of bridge piers and abutments, retaining walls, filtration and sewage disposal plants, and other engineering projects, it is obvious that the forming phase offers the greatest opportunity to save material and reduce labor costs.

The use of Superior Cone-Fast Coil Ties is one direct means of cutting costs and here's why: The *exclusive* feature of this tie is the extension of the coil beyond the ends of the wire struts (enlarged detail above) which allows a reamed Coil Cone to be fitted snugly in place before the opposing panel is erected. No separate gadgets are required. Cone-Fast ties are practically a "must" when large panels are used on walls where the workman cannot get inside the forms. Cone pointed Coil Bolts are easy to engage because of the large square openings in the cones. Bolt Holders (shown on panel form) keep bolts and washer on panel when stripping and moving for reuse.

Cone-Fast Coil Ties are available for Coil Bolts ½" to 1¼" in diameter and can be used with all types of forms. All working parts are returnable. For maximum efficiency plan your form work with SUPERIOR Cone-Fast Coil Ties.



REQUEST a copy of our 56-page catalog. It contains a valuable table for spacing studs, wales, and form ties.

SUPERIOR CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office: 1775 Broadway, New York 19, N. Y.
Pacific Coast Plant: 2100 Williams St., San Leandro, Calif.

Two men can assemble this cab for Mercury truck-tractors in about two hours; 24 bolts secure it to the tractor.

Truck-Tractor Cab

An all-weather cab designed for quick field installation on Mercury heavy-duty gasoline truck-tractors is announced by The Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9, Ill. It is shipped "knocked-down" to the user, and can be assembled by two men in approximately two hours, the company says. Twenty-four bolts secure it to the tractor frame.

Features include a 40 x 16-inch shatterproof windshield of safety glass, an electric windshield wiper, canvas roll-down curtains, celluloid side and back windows, and a 12-gage all-steel body.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 472.

Roadside Development Report

The proceedings of the Thirtieth Annual Meeting of the HRB Committee on Roadside Development are published by the Highway Research Board in a comprehensive illustrated report. The meeting marked the culmination of 20 years of intensive activity on the part of the Committee, for it was in 1930 that the first joint endeavor of the American Association of State Highway Officials and the HRB was initiated to deal with the roadside problem. On this note Charles M. Upham, Consulting Engineer, opened the meeting with a review entitled "Twenty Years of Roadside Development". Other subjects covered by speakers were the effects of roadside development on highway maintenance costs; grading and planting, including ground-cover plants; erosion control, turf culture, and stabilized turf shoulders; maintenance and equipment; special care of trees; and roadside drainage design.

The report contains many interesting pictures contrasting the appearance of roadsides 20 and 30 years ago with that of today; special equipment is illustrated; and maps, diagrams, and statistics accompany the papers.

The HRB Report of the Committee on Roadside Development may be obtained by writing to the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. The price is $1.50.

For "Gunning" Concrete

A 4-page catalog on Bondact equipment for the pneumatic placement of concrete has been prepared by Air Placement Equipment Co., 1009 W. 24th St., Kansas City 8, Mo. It points out that the Bondactor is really two machines in one. When greater production capacity is required for large jobs, the Model 1000-S can be converted to double its capacity. By using a 210-cfm air compressor, a 1½-inch material hose, and the larger Bondactor nozzle, up to 3 cubic yards of premixed aggregate can be applied per hour.

The bulletin illustrates some applications of the Bondact equipment: repairing structural-steel girders and columns, repairing and constructing concrete surfaces, applying insulation and fireproofing with Vermiculite concrete, sealing joints of concrete pipe, and wet and dry sand blasting. It highlights brief specifications and operational features of the unit, and includes a price list for the three available models and their accessories.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 482.

Two Highway Films

Two films on highway transportation in America are available from The National Highway Users Conference.

"Horizons Unlimited", filmed by RKO-Pathe, is available in 16-mm and 35-mm sizes (the larger for regular theater showings) and runs for 17 minutes. It tells, without advertising, the story of the nation's highways and motor vehicles and how they make America click. The NHUC recommends it for showing before business groups, schools, clubs, church organizations, and veterans' groups.

"A Professional Portrait", though also of general interest, deals particularly with the trucking industry. It is a 16-mm film, running for 22 minutes, which was produced for the Automobile Manufacturers Association by Wilding Picture Productions, Inc. Told by a newspaper reporter, it is the story of his experiences among the men behind the wheels of America's motor trucks. The NHUC thinks this film will have special meaning for companies with trucking fleets, safety officials, state and municipal authorities, traffic officials, and educational groups.

Both films will be loaned without charge, although the borrower is expected to pay transportation costs and to obtain projectors and screens. The NHUC will be glad to take orders, but requests advance notice of more than three weeks. To secure either or both of these films for showing, write to National Highway Users Conference, Inc., National Press Bldg., Washington 4, D. C.

only Allis-Chalmers can offer you

1000 Hou

for truck wheels, idlers, support

FULL PROTECTION — only One Greasing Every 1000 Hours with Allis-Chalmers *Exclusive* Positive Seal, Roller Bearing D

Think of it! You can operate for 6 months on a 40-hour-week basis with one lubrication of 14 to 20 of the most-abused, hardest-to-service points on tor. It's possible through an exclusive combination of glass-smooth Positive Sea and anti-friction bearings that help you do more work at lower cost even under toughest conditions! And it's another ahead-of-the-field feature found only in the four new Allis-Chalmers tractors.

These Big Benefits Mean DOLLARS to you!

DAILY GREASING PERIODS ELIMINATED. You save at least 30 minutes every gain about one full month's production every year.

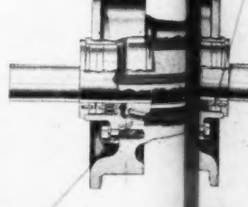
FULL PROTECTION ASSURED. Positive Seals keep grease in . . . dirt and moisture out. 1000-Hour Lubrication gives you protection unchallenged in the tractor field.

SAVES ON GREASE. Truck wheels, idlers and support rollers are grease-filled at the factory . . . need new grease only once every 1000 hours!

EASY TO SERVICE. No more cleaning of dirt, muck and grime from fittings every day. Operator can choose time and place to regrease when conditions are favorable.

Here's the secret

Positive Seals each have g-loaded rings — one stationary, turning the wheel. Ground sm lass, the the grease in . . . keep dust, mu water *out*.



Tapered Roller Bearings Positive by letting truck wheels, support ers rotate freely...without ust or w Reduced friction lets t move produce more drawbar p

the newest finest tractor line on Earth!

HD-20 HD-15 HD-9 HD-5

DESIGNED FOR YOUR JOBS • BUILT TO TAKE IT • EASY TO OPERATE • E SER

Data on Rocker-Type Shovel

A 4-page 4-color catalog describing the use of Eimco RockerShovels on highway cleanup has been prepared by The Eimco Corp., 634 S. Fourth West St., Salt Lake City 10, Utah. The units load from the side or end of the truck; overhead loading is said to be particularly advantageous in clearing highway slides, since it permits opening one lane of traffic at a time.

The booklet provides full specifications and a detailed dimension drawing of the Model 104, whose bucket capacity is 1¼ yards of rock or 1¾ yards of sand or gravel. Its loading speed is 4 to 8 yards per minute.

This literature may be obtained from the company by requesting Bulletin L-1028, or by using the Request Card at page 16. Circle No. 409.

Direct-Reading Level Rod

Literature on a leveling rod that permits direct reading and eliminates computation has been prepared by Lenker Mfg. Co., 599 Chestnut St., Sunbury, Pa. It points out that with the L-E-Vation rod only two columns are needed in the notebook—station and elevation. These rods are available with gradations in either feet and tenths or in feet and inches.

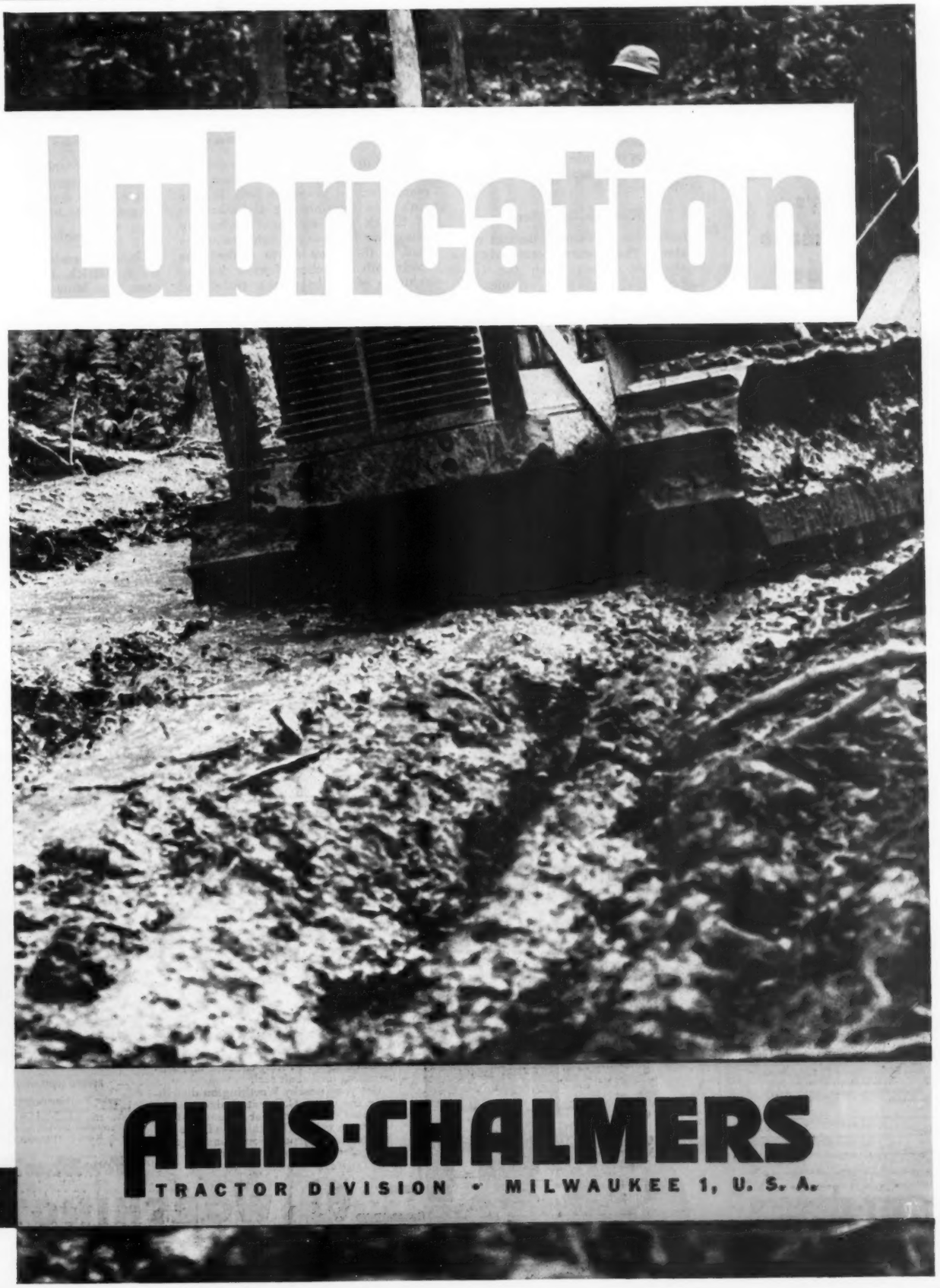
The rod is 5.4 feet long when closed and 10 feet extended. A 13-foot reading may be obtained by using a 3-foot boot or extension. The rod may be put to any use for which an ordinary level rod is adaptable. In operation the steel band is set to the last two digits of a bench-mark elevation; complete elevation is recorded by prefixing other digits to the last two. Since all numbers read downward, future readings from the same level position will record the exact elevation of the new point.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 408.

Data on Anti-Rust Paint

A circular describing Rust-Cure anti-rust paint is announced by The Monroe Co., Inc., 10703 Quebec Ave., Cleveland 6, Ohio. It points out that Rust-Cure seals rusted surfaces and retards further rusting action; it can be applied on rusted surfaces by brush, dip, or spray, without wire-brushing, scraping, or sandblasting; and it is available in black, aluminum, and clear.

This literature may be obtained from the company by requesting Bulletin 136-11, or by using the Request Card at page 16. Circle No. 475.



Corridor State Has Critical Snow Problem

Contractors Help Out on the 1,700 Miles That Must Remain Open at All Times if Heavy Traffic Is to Keep Moving

• NEW JERSEY is not a big state, judged by its area, population, industry, or primary-highway mileage. Nearly bisected by the 40th parallel, it doesn't get the severe snowstorms common to some of the more northern states. Yet its State Highway Department, under the direction of Commissioner Ransford J. Abbott, has a critical snow-removal and ice-control problem.

New Jersey is a focal point for commercial vehicles bringing both raw materials and finished products from the far west and deep south to the eastern and New England states. With a traffic density of 60,000 vehicles per day on its main arteries, the Corridor State is the nerve center of a complex network of roads leading north and south, east and west, to and from the highly industrialized and populated metropolitan east.

A. W. Muir, Superintendent of Maintenance of New Jersey's highway system, therefore has the responsibility of keeping the state roads open *at all times*. "There are no secondary or tertiary roads in our system", says Mr. Muir. "Every one of the 1,740 miles of roadway in the state network has to be kept open 24 hours a day, every day of the year."

Weather Conditions

Jersey has two almost distinct types of storm. The western storms originate in Canada, sweep down the Great Lakes and across the northeastern states, and ride into Jersey bearing crisp, dry snows. Low temperatures prevail and the big storm may leave 20 to 30 inches of white flakes over the northern portion of the state. The second type of storm is more treacherous: a coastal "northeaster", bearing icy rains and wet, soggy snows that blanket the state and place a heavy strain on men and equipment.

The Department relies on the United States Weather Bureau at New York City for forecasts. Headquarter crews at Trenton call the Bureau every day at noon for the next day's outlook. If unforeseen conditions come up, the weather station contacts Trenton immediately. Communication is almost continuous between the two organizations during a heavy storm.

Though winter is officially dated from December 1 to April 1 in this area, highway forces are ready to go early in November and they don't pull in their equipment until April 15.

N. J. State Highway Department Photo

With a traffic density of 60,000 vehicles a day on its main arteries, New Jersey faces a critical snow and ice problem. The worst storm in the Department's memory came in 1947 and choked the roads with 30 inches of snow.

Mr. Muir thinks winters in general are getting milder, and the past few years seem to bear him out. But he can't help remembering the storm in '47. Smack in the middle of the holiday season, with millions of vehicles on the road, a three-day storm choked the roads with 30 inches of snow, leaving a jungle of stalled trucks, autos, and busses to trap plows and other snow-fighting equipment. Only by running up roadsides and median strips, and attacking congested areas from all points, were department and contractor crews able to untie the knot.

Organizational Setup

Under Commissioner Abbott and E. W. Kilpatrick, State Highway Engineer, Mr. Muir directs planning and operation of the state forces, with

(Continued on next page)

2 ways to make crane operations pay more

Rud-O-Matic Magnet Reel Tagline Combination

Steel tagline holds magnet steady and absorbs the load . . . protective slack is maintained in expensive magnet cable to avoid jerking, pulling loose at the terminals or snagging.

Standard with major crane manufacturers, made in five sizes for your present equipment.

Rud-O-Matic Tagline

steadies your clamshell buckets. Provides ample coil spring power at all boom angles to keep bucket lined up with the work. Makes more loads per day easier. Rud-O-Matics are foolproof, trouble-free. Eight sizes meet all requirements. Available immediately. *For full information see your dealer—or mail coupon below.*

I'd like more information on ☐ Rud-O-Matic Taglines, ☐ Rud-O-Matic Magnet Reel-Tagline Combinations. Send literature and complete details.

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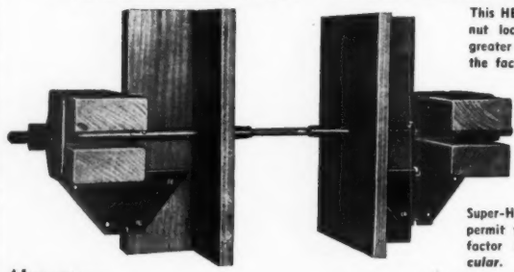
McCAFFREY-RUDDOCK Tagline CORPORATION

2131 East 25th Street • Los Angeles 58, California

New FORM TIE development

HEX-LOCK—SINGLE-UNIT



This HEXLOCK Clamp has a floating nut locked in place. This permits greater ease of operation, due to the fact that you are turning metal on metal instead of metal on wood. This Clamp can also be used directly with our Vibro-Lock Clamp in cases where walls may have a steep batter on one side only. All our clamps employ Super-Hi Tensile Inner Rods, which permit faster pouring with a known factor of safety. *Write for Circular.*

Also use—

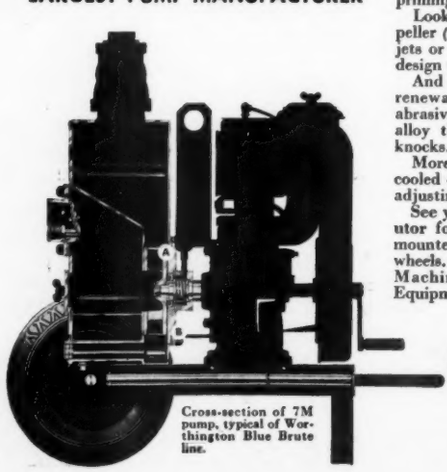
Williams Super-Hi Tensile Tie Rods, Couplings, Pig-Tail Anchors, Form Aligners, Corner Clamps, Waler Supports, and Assembly Motor Units.

WILLIAMS FORM ENGINEERING CORPORATION

1501 Madison Ave., S.E., Grand Rapids 7, Mich.

Simplest, sturdiest, most economical contractor's pump ever built

MADE BY THE WORLD'S LARGEST PUMP MANUFACTURER



Cross-section of 7M pump, typical of Worthington Blue Brute line.

It takes Worthington's unequalled experience to give you the most in a self-priming contractor's pump.

Look—only two moving parts, the impeller (A) and shaft seal (B). And no ports, jets or valves to clog. That's the kind of design that keeps you out of trouble.

And look at the materials. Impeller and renewable wear plates made of special abrasive-resisting alloy . . . casing is a steel alloy that defies rust, erosion and hard knocks.

More trouble-savers: easy-starting air-cooled engine . . . fully-enclosed and self-adjusting dual shaft seal.

See your nearby Worthington distributor for the A.G.C.-rated sizes, base-mounted or with steel or pneumatic-tired wheels. Or write to Worthington Pump and Machinery Corporation, Construction Equipment Division, Dunellen, N. J.

RUGGED LIGHT-WEIGHT PUMP

Popular Worthington 4M has earned contractors' enthusiastic OK on all sorts of jobs. Has fabricated all-steel casing to take roughest service, yet weighs less than 75 lb. Hand carriage also available.

BUY BLUE BRUTES

WORTHINGTON

H.1.9

equipment "rented" from the Division of Plant and Equipment headed by F. C. Young. Supervisors in charge of each of the five state districts control operations on the local level. Though minor or scattered storms may be handled directly by the supervisors, operations during all general storms are controlled directly from the Trenton office, kept open 24 hours a day during emergencies.

A 6-foot map in the headquarters office is the control panel for snow-fighting operations. Each of the 140 road sections, averaging 12 miles in length, is marked in color on the map. Colored stickpins show the status of state and contractor forces during the battle: *blue*, equipment called; *red*, standby; *yellow*, ordered plowing; *white with black stripe*, all equipment not out; *black*, equipment recalled. An efficient tactical map on which to plot the struggle to open roads for commerce, it would also help, if necessary, to provide clear arteries of flow for military and disaster-relief units.

Snow Fighting by Contract

On 90 of the 140 road sections, contractors are involved in snow removal under the supervision of a department representative. Contracts are set up during the summer and early fall. In one type of contract the contractor furnishes trucks, personnel, and supplies, and the State furnishes plows and sanders. In the other, the contractor furnishes only personnel. Payment is made on an hourly basis, depending on the gross vehicle weight of the equipment in the first kind of contract, and at a uniform rate where only personnel is furnished. For the purpose of computing pay, equipment is grouped into three categories with gross vehicle weights of 15,000 to 20,000 pounds; 20,000 to 25,000; and 25,000 and up. Rates are $9, $10, and $11 per hour respectively for straight time, Monday through Friday. Saturday is $1 more per hour for each class and Sunday and holiday rates are $2 higher for each class. Standby time is the same for all classes of equipment: $7.50 per hour during the week, $8.50 on Saturdays, and $9.50 on Sundays and holidays. The average contractor works about 3 trucks and 7 men on his section.

This system is tied in with the master control map. As each contractor receives his orders and reports in, the time is entered on call and recall sheets, providing a complete record for payment of contractor forces. Equivalent sheets are not necessary for the state forces, since each foreman has to submit a daily time and cost report to Trenton.

Keeping track of all personnel involved in snow removal can be a tough job in itself. Mr. Muir has an "Organizational Chart of Snow Removal Force" right at his desk to tell him at a glance who's responsible for what. It gives the mileage and geographic limits of each of the 140 sections, telling whether state or contractor forces are in charge; it lists the men's addresses and phone numbers, the name and phone number of the superintendent, the equipment-storage location and phone number, and the names and phone numbers of the Department's representative, mechanics, and relief men. It's a valuable piece of paper when you are directing 1,000 machines and 2,000 men.

Equipment

As soon as snow starts to fall, equipment is on the move in Jersey. Light plows are sometimes all that is necessary for the job. But if the storm is

(Concluded on next page)

N. J. State Highway Department Photo

This winter the N. J. Highway Department had 550 trucks ready—almost all Macks—with one-way, reversible, and V-type plows.

no meat except chicken, other eats pork and chi but no beef—beef being

the lure now is the chance being in on the kill—that nig when some youngster will kno

the Bomber into retirement for keeps.

Up New England way they think the time has come. Spill-

punt just so the passer will have a chance to get the ball away without being chased

POWER BUGGIES SPEED WORK ON WORLD'S LARGEST UNDERGROUND GARAGE

WHITEMAN BUGGIES PLACING 50,000 CU. YD. OF CONCRETE FASTER—AT FAR LESS COST!

Pershing Sq

Pour First Co

Garag

Pershing Square underground gara today, pouring the first for the struc- roof. it will take 5000

Trees and grass will soon grow again in Los Angeles' Pershing Square... but underneath will be parking space for 2000 cars at one time. Concrete for this 630,000 square foot garage is speeded to all parts of the job by Whiteman Power Buggies... over narrow runways, up 25% grades... then placed quickly with Whiteman's positive control "in-gear" dumping mechanism. One Power Buggy does the work of 6 men with wheelbarrows and does it faster. Carries 12 cu. ft., yet is light weight. 7.5 hp aircooled engine. Speeds up to 16 mph. Rugged, dependable. Priced to pay for itself in a short time. Send coupon for details *now!*

WHAT THE CONTRACTORS SAY:

C. A. McMahon, superintendent of construction for Ford J. Twaits Co., Morrison-Knudsen Co., Inc. and T-S Construction Engineers, Inc. on City Park Garage, says: "Our Whiteman Power Buggies are doing a tremendous job. It amazes me how they speed along the runways, turn on a dime and squeeze through tight spots all day long, yet never get tired. They're cutting costs and speeding up the job in a big way."

Whiteman
CONCRETE EQUIPMENT

WHITEMAN MFG. CO., Dept. CE
3249 Casitas Ave., Los Angeles 39, Calif.
Please send name of distributor, literature and prices on Whiteman Power Buggies.
Name
Firm
Address
City Zone State

Give Blood!
Call Your RED CROSS Today

Corridor State Has Critical Snow Problem

(Continued from preceding page)

general and snowfall gets in the ½ to 1-foot range, heavy plows are called out. This winter the Highway Department had in readiness 550 trucks, mounted with displacement plows; 15 Walter Snow-Fighters; 2 Snogos, a Bros, and one other rotary; 3 heavy graders; and 4 displacement plows for Caterpillar tractors. The trucks are almost all Macks in both the 17,000 and 22,000-pound GVW range. The plows—one-ways, reversibles, and V-type—were all made by Good Roads Machinery Co.

During periods of inactivity, department equipment is kept relatively close to the place it will be working—usually in a heated enclosure. Since most of the trucks, loaders, and tractors are year-round units, they get constant maintenance. The plows and spreaders are cared for at the district shop, except where major overhaul, in Trenton, is required.

New Jersey, like most other states in the snow belt, has tried to secure equipment that will perform year-round. With the exception of the rugged Walters and the rotaries, definitely needed for the big snows, Jersey concentrates on the ever-ready dump truck and detachable plows and spreaders.

A big safety improvement on the highway department equipment is a new type of lighting standard. The dual red flashing signal, visible front and rear, is still in use (rather than the dual blue light) but its standard is mounted on the truck-body frame so that the flashing signal is not hidden from view when the body is raised for spreading. The lamp is swivel-mounted on the standard so that it hangs in a vertical plane at all times.

Ice Control

Ice control is handled in all cases at the local level. Supervisors and foremen have standing orders to keep ice off the roads at all times, day or night. Traffic density on the state roads makes it imperative that treatment be immediate, and crews are on constant call when temperatures drop and storms move in.

So far Jersey hasn't used any straight chlorides. Treated abrasives are stockpiled at roadside trouble spots or at local yards, bucket-loaded into dump trucks, and spread by trailing spreaders. Most of the units, 233 of them, are Good Roads 4-U spinner-type spreaders which can be hitched to any dump truck. The State also has a dozen heavy-duty Jet spreaders, mounted on Mack or Walter trucks. There are about 30 Nelson bucket loaders spread out at various key locations for loading the trucks.

Except for a few urban areas, the State hasn't done much about cleaning up cinders and sand after the ice melts. "This is not so good", Mr. Muir said. "The abrasive either dries up and causes annoying dust on the roads, or washes into drainage structures so that they require more frequent cleaning. We're using a couple of new power pick-up sweepers this year", he said.

Annual Cost

Because of the extreme variation in weather from one year to the next, average costs are of little significance. New Jersey spends about $1,000,000 to $1,500,000 per year for snow and ice control. This figure includes all costs: administration, labor, materials, equipment, storage, and outside contracts. The heaviest expenditure was $1,618,175 in 1948, a little under $1,000 per mile for the 1,716 miles in the state system.

On the whole, costs have been split about 63 per cent for snow removal and 37 for ice control. In the last few years, though, the State has been doing more ice-control work and the percentage for this work has gone up.

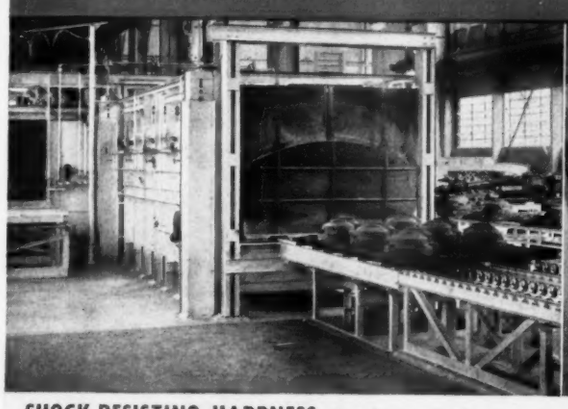
Snow fences are also an important part of the total cost. The Highway Department had about 1,000,000 feet in place this winter. Where it is used, and how it is positioned relative to the road, is purely a trial-and-error matter, Mr. Muir tells us. Jersey puts up fence in November and starts taking it down in February in the southern part of the state. That's a lot sooner than the Department likes, but the farmers down there plow early. In the northern section of the state, the fence is all down by April.

Winter is not over yet, so it's too early to tell what kind of weather may still come. As Mr. Muir put it, "It's in the lap of the gods." But one thing is sure: whenever snows roll in, and those blue pins start popping up on the map in the Trenton office, New Jersey's Highway Department is ready for them.

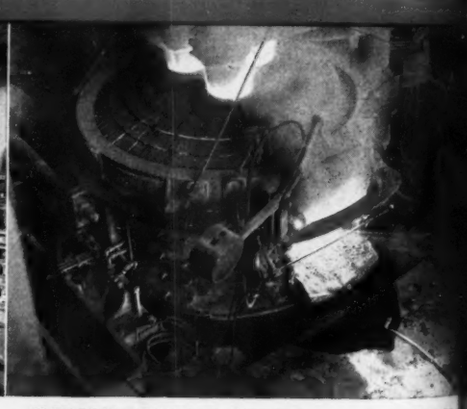
C. & E. M. Photo

A Beaver 4½-inch pipe threader (right) and an Oster 2-inch pipe cutter (left) saw service during the construction of a 1,400-pupil high school in Hackensack, N. J. A. A. La Fountain, Inc., of Hackensack is the general contractor.

SMOOTH, STEADY OPERATION of this ¾-yd. 22-B dragshovel is shown during finishing work on a large basement in Los Angeles, Calif.



SHOCK-RESISTING HARDNESS is given castings treated in this new, completely automatic heat-treat furnace. Such pre-assembly care pays off later in long machine life.

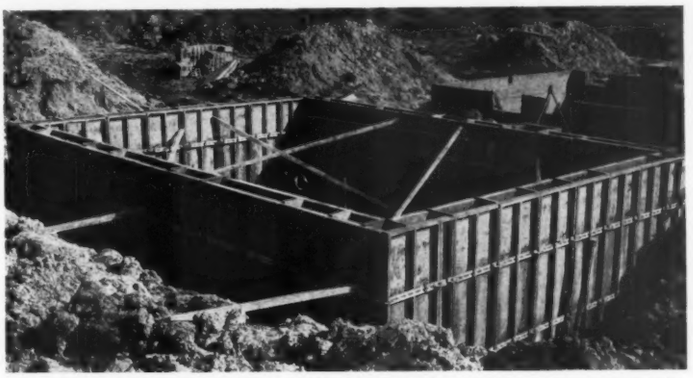


MODERN FOUNDRY METHODS are exemplified by this electric furnace in operation. In its own foundry Bucyrus-Erie has pioneered in the development of steels especially suited for excavating equipment.

New Forming System For Light Buildings

A rapid and simple method of forming concrete walls for basements, one-story homes, and light commercial buildings has been developed by Rocform Corp., 15160 W. Eight Mile Road, Detroit 35, Mich. The form system is composed of plywood facing on 2 x 4 studs with permanently attached aluminum wales. Forged tapered tie rods carry work loads up to 7,200 pounds and automatically give the desired wall thickness.

The company points out that the forming walls are immediately spread and tied together in one operation when the tie pins are inserted into the tie rod and wale lip. The rod may be quickly reclaimed from every job. The use of lightweight permanently attached aluminum wales is designed to eliminate wale handling and replacement. The clamp locking two panels together or any Rocform hardware is set in place with a hammer.



Aluminum wales are permanently attached to Rocforms, shown here set up and ready for a pour. The system is designed for wall pours for basements, one-story houses, and light commercial construction.

No special tools of any kind are required.

The company reports that the Rocform hardware is easy to assemble or strip. Everything that is necessary for form erection is supplied complete, and no heavy equipment is required.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 425.

Critical Equipment Restored by Plating

A new process that will restore the original dimensions of worn parts has been developed by Van Der Horst Corp. of America, Olean, N. Y. For about a third less than the price of new replacements, according to the company, such items as compressor cylinders, crankshafts, diesel-engine liners, and the like can be rebuilt with a wear-resistant plating of Vanderloy M. Critical parts shipped to the company's plant in Olean, N. Y., are completely processed and returned to the user restored to original dimensions.

Parts received at the plant are first inspected, then dipped in an alkaline solution to cleanse them and remove rust. Small breaks, cracks, or chipped holes are welded where necessary. The worn bearing surfaces are machined to re-establish the plane or concentricity of the original surface. The part is then prepared for plating.

The plating itself is accomplished by dipping the part into a tank containing the electrolyte of Vanderloy M. The deposit can be made up to ¼-inch radial thickness or more. The limited thickness is determined by economics and design rather than by the plating bath. Variations in bath composition and plating conditions can produce a Vanderloy M with tensile strength as high as 100,000 psi or as low as 50,000 psi, the company says. The plated material has a tendency to be tough, according to the company, but can be machined with high-speed steel cutters.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 430.

Data on Electric Trucks For Materials Handling

A 16-page bulletin describing the Yale Worksaver line of motorized hand trucks and electric stackers has been released by the Philadelphia Division, Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15, Pa. It contains illustrations and describes features, applications, and attachments.

The Worksaver line includes platform, high-lift platform, high-lift fork, and tractor trucks in capacities up to 6,000 pounds. Features cited in the bulletin are dual-drive control, dual-acting safety brake, direct gear drive, no flexing wires, easy maneuverability, armored front end, etc. The bulletin lists the following attachments for specialized operation without pallet: gooseneck boom, rotating fork, clamping device, Bartel device, load hugger, side-shifter, end-dump hopper, and rotating clamp.

This literature may be obtained from the company by requesting Bulletin P809, or by using the Request Card at page 16. Circle No. 481.

Two Euclid Color Films

Groups interested in watching earth-moving machinery in action may now see two new 16-mm color sound films released by The Euclid Road Machinery Co., Cleveland, Ohio. "More Power to You" is a 10-minute film showing the Euclid Twin Power scraper at work on coal-stockpiling and reclamation. "What's Behind the Euclid Name?" runs for 20 minutes and shows the development of Euclid earth-moving equipment from early days to the present time. It also shows some behind-the-scene views of the company's plant and manufacturing processes, and job applications of several different types of Euclid equipment.

To obtain either or both films on a no-charge loan basis, apply to any Euclid distributor or write to the Sales Development Department, The Euclid Road Machinery Co., Cleveland 17, Ohio.

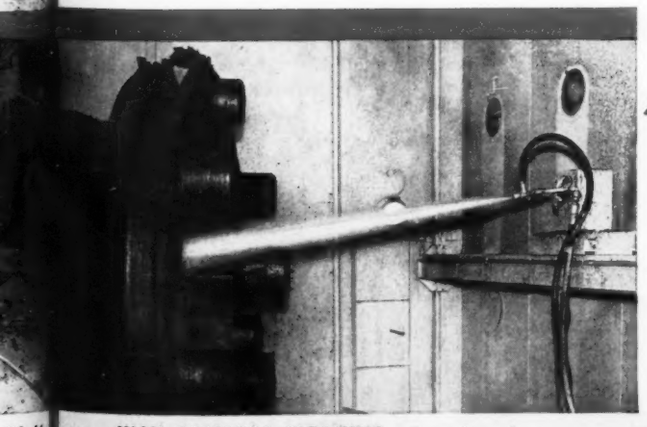
Here's Why You Buy Quality When You Buy Bucyrus

FOR 71 years the most-wanted excavator line in the contracting field—that's Bucyrus-Erie! Such year in, year out preference reflects the quality built into every Bucyrus-Erie machine — the result of the industry's largest full-time engineering staff, with an unmatched background of field experience, plus thorough laboratory tests of all materials. Such rigid manufacturing controls combine with careful field testing to produce a machine that **you know** will perform exactly as specified.

To a contractor engaged in the most extensive building program in America's history, this close attention to quality means that you'll have a machine that will take tough going in stride for many years to come . . . one that will offer fewer maintenance problems — produce higher output records with less downtime.

While heavy defense demands are in effect upon manufacturers of excavating equipment, it will pay you to see your Bucyrus-Erie distributor now for the delivery picture on this "quality proved" line of ⅜- to 4-yd. gasoline, diesel and single-motor electric excavators. They're worth waiting for!

308E51C



HIGH PRESSURE CLEANING of rough castings with sand-water-blasting equipment is but one of the high-grade casting-cleaning methods employed before precision machining.

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BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

Tap, Drill Lubricant

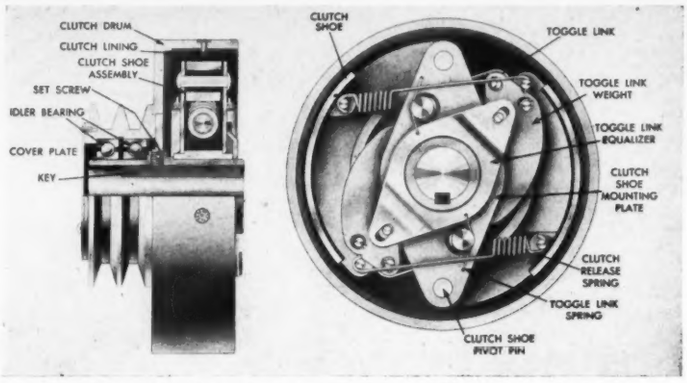
A cooling and lubricating agent said to increase production and at the same time lengthen the life of taps, drills, and cutting tools is announced by Tap & Drill E-Z Corp., 11033 Hawthorne Blvd., Inglewood, Calif.

Lubri-Cut is a fire-resistant compound, said to be free from all abrasives and acids, and to be composed of special cooling and lubricating agents that cling to the tool. It is available in both paste and semipaste form and may be used on hard or soft and ferrous or nonferrous metals, on plastics, or on glass.

Free samples and further information may be secured from the company. Or use the Request Card at page 16. Circle No. 417.

New Automatic Clutch

A new type of automatic clutch, the Tog-o-loc Series, is announced by Salsbury Corp., 1161 E. Florence Ave., Los Angeles 1, Calif. It is designed for operation on any 7 to 15-hp engine with a 1⅛, 1 7/16, or 1½-inch standard shaft. It has a normal engagement speed from 11 to 1,200 rpm but disengages at 800 rpm, the company says. This is made possible by the Tog-o-loc mechanism, a linkage connecting heel and toe of the two opposing shoes. The toggle lock is centrifugally actuated and equalized on both the pickup and the release of the load. Both clutch drum and pulley assembly ride free on dual ball bearings during idling periods.



Tog-o-loc automatic clutches have a normal engagement speed from 11 to 1,200 rpm but disengage at 800 rpm, thanks to a special linkage mechanism.

All models in the Tog-o-loc Series have hub bores mating with standard engine shafts, and necessitate no extension, grinding, boring, or slotting. They are available with standard-size pulleys with single and double grooves, or with plain hubs onto which special service pulleys may be mounted.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 476.

Small-Size Crawler Tractor

An 8-page catalog about the Agricat, a midget-size crawler tractor, has been prepared by Earl H. Pence & Co., Inc., 2150 Washington Ave., San Leandro, Calif. Because of its small size, the Agricat is adaptable to bulldozing and cleaning in narrow ditches or trenches, grading and dozing close to buildings or other obstructions, and clearing brush on hilly or rocky right-of-way. It may be fitted with a bucket, rotary broom, dozer blade, snowplow, disks or scarifiers, and spring-tooth harrows.

The literature points out that the Agricat serves where a heavier tractor is not necessary but where expensive hand labor can be reduced by its use. The bulletin contains complete specifications and on-the-job photographs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 478.

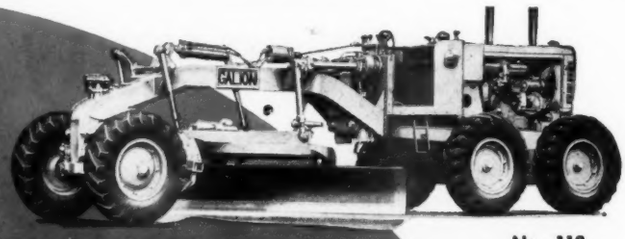
Air-Entraining Agent

A broadside about Foamasol, a new foaming and dispersing agent for air-entrained concrete, has been prepared by Onyx Oil & Chemical Co., Industrial Division, 190 Warren St., Jersey City 2, N. J. It outlines the chemical and physical properties of the product, reasons for its development, and applications. It reports field and laboratory tests and gives data on the use of Foamasol for on-the-job concrete mixing, trans-it-mix concrete, concrete products, etc.

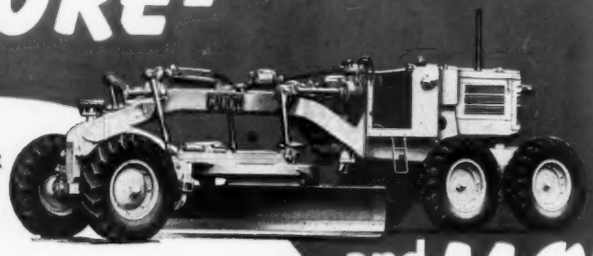
The manufacturer reports that Foamasol will increase concrete's resistance to freezing and thawing; improve workability, cohesion, and plasticity; reduce bleeding; and eliminate segregation.

This literature may be obtained from the company by requesting Bulletin No. C-10, or by using the Request Card at page 16. Circle No. 499.

MORE and MORE-



No. 118 MOTOR GRADER Extra Heavy-Duty 100 h.p. Diesel Engine

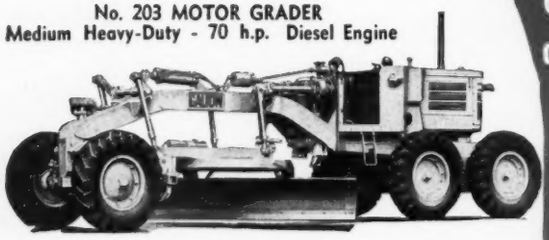


No. 104 MOTOR GRADER Heavy-Duty - 76 h.p. Diesel Engine

and MORE-

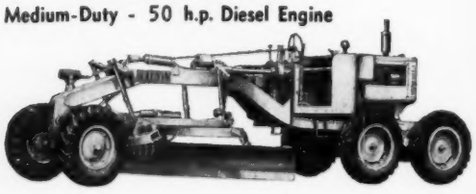
CONTRACTORS, HIGHWAY and STREET DEPTS. ARE USING GALION GRADERS

No. 203 MOTOR GRADER Medium Heavy-Duty - 70 h.p. Diesel Engine



Superior Value and Performance Count --- with experienced construction men. That's why their preference for GALION Graders is becoming more pronounced every day. A size for every need and use. Write for information on the size in which you are interested.

No. 303 MOTOR GRADER Medium-Duty - 50 h.p. Diesel Engine



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It's Checkup Time For Your Air Tools

Now, More Than Ever, Preventive Equipment Maintenance Keeps You in Business, Producing and Profiting

• SEVERAL months ago we urged contractors to take out their stethoscopes and fluoroscopes and start giving their shovels, cranes, and draglines ever sterner and more regular checkups. Since new equipment and new parts are becoming harder to get, we repeat the advice, and turn this month to pneumatic tools—rock drills in particular.

The modern rock drill is built to take high-speed operation and constant pounding. But it's a precision instrument, like the heart or liver, and therefore will work better and last longer with care. Drill care means, perhaps first of all, proper lubrication.

Lubrication

Men in the field say that when a rock-drill piston sticks, nine times out of ten the cause is lack of oil. For overheating produces tiny cracks across the surfaces of parts, at right angles to the direction of motion. This scuff or scoring on parts as close-fitting as a rock drill's will finally stop the drill. It may even result in a progressive fracture and an eventual break.

So oil your drills regularly, following manufacturers' recommendations as to the correct viscosity for the prevailing operating temperature. Fill the oil pockets in a hand-held sinker-type drill before starting it, and about every three hours afterwards — especially when the drill is new! Fill the air-line oilers of drifters and stoping drills twice each shift. Remind operators using a line oiler with a long hose that it may be some time before the oil can work its way through, say, 50 feet of hose (especially when it's new); ask them when they're starting their machine to keep putting oil in its lubricator or into the air inlet until the line oiler is feeding through enough oil.

Have them check the drill exhaust frequently, too, looking for the mist of fine oil particles that spells proper lubrication. It's also a good idea to flush out the drill in between regular cleanings by pouring a little kerosene into the air inlet, running the drill a few minutes, then pouring a small amount of the correct lubricant into the same inlet.

Regular lubrication with good, clean lubricants pays a double dividend. It gives your drill a longer working life—and a more efficient one. Experts tell us that well oiled machines cut half again as much footage as dry machines. And the same holds true for drills whose parts are up to par instead of badly worn.

Inspection

Now more than ever it is important to disassemble drills regularly, and clean and examine their parts. For worn parts detected early can be repaired this side of complete breakdown. And if replacement is indicated, the earlier the parts order the more likely the delivery *in time* to keep your machine producing.

Inspect the drill steel, of course, and keep it sharp. If the end is rounded, the area of contact between the striking face of the piston and the shank end of the drill steel is reduced. This means that the full force of the piston blow is concentrated in a small area.

(Continued on next page)

Photo Courtesy Compressed Air & Gas Institute

When handling pneumatic tools, especially in dusty areas, it's important to keep the air from carrying dirt into the tool where it will act as an abrasive and offset the good effects of lubrication.

"Let the shovel go . . . but hang on to that DIPPER"

When the preference for an Amsco Dipper is so strong that a superintendent at one of Minnesota's largest iron mines quietly removes it from a shovel being shipped to another mine, there are apt to be some good performance reasons why!

The superintendent reported that this AMSCO 6½ yard renewable lip dipper *loaded a record number of tons per 8 hour shift*—more than had ever been loaded before. And, where other dippers needed repairs every 2 months or so, it is still going strong after 6 months of service with no repairs of any kind!

Better design and construction are the reasons for this high production and longer, uninterrupted service. The wide mouth and shallow depth permit faster, easier digging and loading, and a 4-way taper insures clean dumping every time.

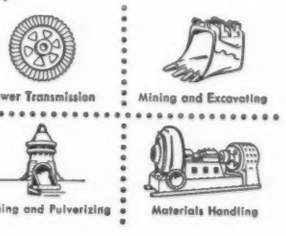
And, this dipper is *all-cast*—of tough, work-hardening AMSCO Manganese Steel. The renewable lip and heel plate, when finally worn, are replaceable in a matter of minutes.

Dippers can—and should be—bought with an eye to higher digging efficiency and lower costs per ton . . . and the moral of this actual on-the-job example is clear . . .

WHEREVER YOU MEET A PROBLEM OF WEAR CAUSED BY IMPACT AND/OR ABRASION . . .

. . . find out about longer-lasting, dollar-saving Manganese Steel Dippers made by AMSCO . . . world's largest producer of manganese steel castings for all industry.

AMSCO controls impact and abrasive wear in 5 basic industrial operations:



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Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.
Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

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It's Checkup Time For Your Air Tools

(Continued from preceding page)

The result? Rapid cupping of the piston striking face—and chipping.

Watch the shank; see that it's the proper length, and that its striking face is square and flat, free from cracks or spalls, with the corners slightly beveled to an angle of 45 degrees. The end where the piston strikes must be soft enough for a new file to take hold, but not so soft as to spread under the piston hammering. Shank ends should be quenched in oil, not water; water tempers them too hard, and particles chipped from the drill steel will then be pounded back into the shank end and the piston striking face—with harm to both.

Shanks that are smaller than standard across the flats, or that have rounded corners, will soon wear out the chuck. And if the chuck is not removed, they will round the corners of all other drill steels used. **Both worn** shanks and worn chucks cause a distinct loss of blowing power.

If you allow chucks to wear oversize or bell-mouthed, they will hold the drill steel out of line and permit the piston to hit the edge of the shank in such a way as to break down the striking end. A chuck that is worn large tends to round the corners of the drill steel.

A properly formed drill bit gives the correct cutting clearance at the sides; then only its reaming edges are in touch with the sides of the hole. But when it's worn it will no longer be free in the hole. Drilling progress will slow up or stop. Worse: the drill steel and the drill mechanism, particularly the piston, will have to absorb the whole shock of the hammer blows. And there goes your machine, long before its time.

All these parts are interdependent, so never install new parts in conjunction with badly worn parts; they will not be able to **function efficiently.**

Operation

It goes without saying that drills properly operated live longer. Don't let operators pound the drill if the steel is stuck; it's much better to hit the stuck steel to loosen it. Don't let them pull up the drill steel while the machine is running at high speed. When it's necessary to use a hand drill for many flat holes (a common cause of excessive chuck wear), have them use a 1-inch hex steel with a collared shank 4¼ inches long. Have them blow deep holes often to keep the steel from sticking and keep the bit from wasting its energy pounding the cuttings in the bottom of the hole. In this connection, the little trick of running the drill upside down on its handle to free impacted cuttings saves a lot of trouble.

Tell your operators to take the minute or two needed to change from a short starting steel to a longer one; they'll get the hole started straight that way. Remind them in wet drilling to see that the hole in the drill steel is large enough and on center; otherwise the end of the water tube may be damaged and the water will run out of the chuck instead of down the drill steel. And have them regulate the water pressure carefully in wet drilling so that it's always lower than the air pressure at the face; otherwise water will get into the drill and lower its efficiency.

Perhaps most important of all—tell operators to watch for and report at once sluggish or erratic drill behavior. For this is the symptom of that trouble you want to detect early before it means breakdown.

Sluggishness suggests improper lubrication or foreign matter in the air line. Improper rotation suggests pawls that are worn out or stuck, weakened pawl springs, or a worn rifle nut or rifle bar. Fogging around the drill means too much water in the air line, high humidity in the working area, or too much oil. Erratic drill behavior points to dirt or bits of rubber in the air line, or a binding bit caused by a worn gage. Slow drilling often indicates worn or improper shanks, or worn parts in the rotating mechanism. The complaint that the drill "just doesn't run right" may mean that nuts, bolts, oil plugs, or side rods have worked loose.

Your operator can be your front-line defence in preventive maintenance. Teach him his responsibility.

Small Tools

Most of these precautions apply equally to small hand tools—with a few special footnotes. Keep the housing bolts of small tools tight, or poor performance and damage will result. And watch how your men move these tools. Dragging a pneumatic grinder along the floor is just about the worst punishment it can get. Effects are lethal on the trigger, the driveshaft, the grinding wheel, the housing, or the hose coupling.

As with rock drills, lack of lubrication is the chief cause of wear and consequent loss of power in small air tools. Most of these portable tools have an oil reservoir which should be filled once or twice a day with a light oil recommended by the manufacturer. Tools that don't have a reservoir, such as small wheel grinders, should have an oiler in the air line—or light oil may be injected in the air inlet every two or three hours. Special care should go into the choice of grease for the gearcases of the tools; doublecheck the grade. And bearings, if the double shielded type, should not be washed but should merely be wiped clean, taking care not to deform the shields.

If pneumatic chippers and riveters are going to be idle for a week or more, have your men take them apart, clean and oil them, and carefully reassemble them. Then, before they go back into service, a little light oil in the air inlet and a few seconds of running the tool free are worthwhile trouble-shooters. To keep chippers

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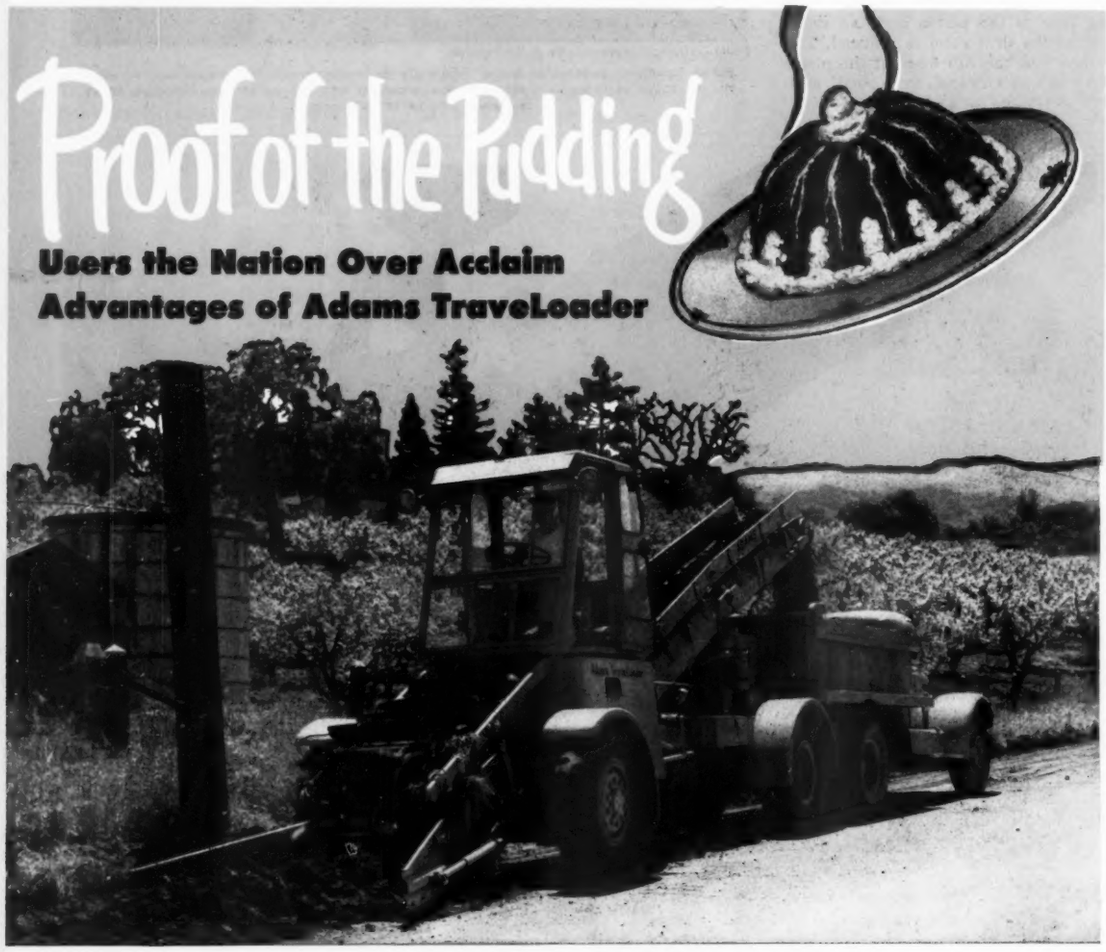

Read what users say—

Tennessee State Highway Department—"Adjustable gathering molds work fine and travel speed is good. Central location of cab is excellent, providing better vision with reference to trucks and traffic."

Clinton County, Indiana—"Like the TraveLoader's sturdy construction—no vibration. In fact, there is no comparison between this machine and others."

City of Roanoke, Virginia—"TraveLoader is ideal for city work. It is a good, well-balanced design and has been highly satisfactory."

Wesco Paving Company, Tennessee—"High front axle clearance of TraveLoader keeps conveyor belt from running too close to the ground. We also like the locked differential and large tires."

Santa Clara County, California—"Centrally-located cab gives operator very good vision of entire operation. We like the way it is built."

Other TraveLoader features that users like include: **High-Speed, Full-Floating Feeder** . . . For faster delivery of material • **Adjustable Conveyor** . . . Accommodates trucks of all sizes—better material distribution, bigger loads, less dust • **Heavy-Duty, Industrial-Type Engine** . . . Built for long, dependable operation • **All-Welded, Box-Type Frame** . . . Insures exceptional strength and rigidity for long-life dependability.

J. D. ADAMS MANUFACTURING CO., INDIANAPOLIS, IND.

Adams

Motor Graders TraveLoaders Pull-Type Graders

and riveters in really good condition, submerge each tool, as soon as it is taken out of service, in a bath composed of equal parts of kerosene and light machine oil. As before, a little light machine oil should be placed in the air inlet and the tool operated for a few seconds.

Pneumatic grinders and drills usually have governors to control the maximum free speed. Teach your men to keep tool operating speeds within the manufacturer's recommended range.

As for parts to watch—blades, are, of course, the wearing parts of all rotary-type tools, and blade life can be substantially increased by proper lubrication. A badly worn blade, however, should be replaced immediately before the tool fails to develop full power, air is wasted, and worn blades drop into the cylinder and cause serious damage. Bearings should be replaced as soon as they show signs of excessive wear; otherwise the tool can be seriously hurt and your spare-parts bill can become staggering.

So much for air tools themselves. What if all these precautions have been taken and the tool still acts sluggish, sick? The trouble may lie, then, with the compressor and air-distribution system. In a subsequent article we shall relay some data from the Compressed Air & Gas Institute on the proper care and use of compressors. Hope you find both articles helpful.

Saw-Wax Coolant

A wax coolant for power hacksaws and routers has been developed by S. C. Johnson & Son, Inc., Racine, Wis. It is a nonflammable aqueous wax emulsion with excellent cooling and lubricating properties, the company claims, and it increases the life of saw blades, reduces wear of router bits, and eliminates much of the welding and burring on routed edges. The lubricity of the coolant is said to make it easy for the operator to pull and guide his router.

When degreasing is necessary, the residual coolant can be removed from the metal in conventional vapor degreasers or in alkaline washers. Coolant No. 170 is not intended for use in machines which have return systems.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 477.

One-Passenger Truck

A single-passenger truck, the M310, has been introduced by Cook Bros. Equipment Co., Los Angeles 31, Calif. It is designed especially for work where a short wheelbase and large payload capacity are of prime importance. The unit has a lightweight high-tensile-steel dump body with a legal payload capacity of 15 tons. The wheelbase is 174 inches, and the truck is equipped with a dual hydraulic hoist and dual gear drive. The M310 trucks are available with a single driving axle, or a single driving axle with a third-axle attachment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 498.

Where a short wheelbase and a large payload capacity are needed, Cook Bros. Equipment Co. recommends its M310 truck. Its legal payload capacity is 15 tons.

Blacktop Association

The New York State Bituminous Concrete Producers Association held its annual convention recently at the Roosevelt Hotel in New York City. There was an attendance of 231 members and guests—the largest convention ever held by the Association.

The following officers were elected to serve in 1952: President, H. M. Van Cleve, Syracuse; Vice President, James L. Holden, Batavia; Treasurer, Avery L. Bullen, Fort Edward; Executive Secretary, Gus Rayner, Albany. Directors for a two-year period were elected as follows: William H. Peckham, White Plains; Arthur J. Hendrickson, Cedarhurst; Reilly Hayes, Utica; George E. Schaefer, Rochester; and Robert U. Blades, Hornell.

SAW CONCRETE .... OR ASPHALT with CLIPPER CONCRETE SAWS THIS FAST-EASY ECONOMICAL WAY!

NOW SAW . . . BEFORE BREAKING! On patches and trenches the removal costs are reduced more than 25% and replacement material is poured to straight, smooth edges. A sawed cut made ¼ the slab depth provides a perfect plane of weakness for fast breaking and removal.

Patches... Eliminate spalling and fractures around repair patches by sawing before breaking. Saw clean, straight lines, break smooth, then patch perfectly in building floors, runways, drives, etc.

Trenches... Gas, Water, Electric, Sewer, Telephone . . . wherever new lines are installed or old ones repaired. Saw trenches . . . any width . . . then break out to straight, smooth edges — no fractures beyond removal lines.

Contraction Joints... Saw contraction joints in continuously poured slabs and eliminate costly hand forming and usual spalling. Building floors, highways, streets, runways, walks, etc. can all be sawed.

MODEL C-130
One of FIVE MODELS
Gas or Electric Power

Free Trial... You can TEST—actually TRY a Clipper Concrete Saw on YOUR Job without obligation! Write for details! . . . by the Originators of Masonry Saws.

MAXIMUM ECONOMY IN CONCRETE CUTTING ONLY POSSIBLE WITH THESE EXCLUSIVE CLIPPER FEATURES

1. Clipper "No Bind" Floating Three Point Suspension Automatically protects blade.
2. Positive Screw Feed Instant control raises or lowers blade smooth, easy
3. Adjustable Depth Lock Set this handy stop for whatever depth desired.
4. Patented Spray Control Its value is measured in increased Blade Life.

Clipper
KANSAS CITY 8, MISSOURI
PITTSBURGH, ST. LOUIS, CLEVELAND, INDIANAPOLIS, DETROIT, HOUSTON, AUSTIN, TEX., CHICAGO, LOS ANGELES, PHILADELPHIA, SAN FRANCISCO, CINCINNATI, NEW YORK, ATLANTA, WASHINGTON, D. C., BOSTON, BIRMINGHAM, KANSAS CITY
"COAST-TO-COAST"

GENUINE CLIPPER BLADES—ALL DIAMETERS
DRY-WET & B-R BLADES
DIAMOND BLADES

MAIL THE COUPON TODAY!

Serving the World as the World's Largest Manufacturer of Masonry Saws

CLIPPER MANUFACTURING CO.
CONCRETE SAW DIVISION
2803 N. W. Warwick, KANSAS CITY 8, MO.
Send FREE Literature, Information and Prices on the NEW CLIPPER CONCRETE SAWS 7-C
NAME _____
COMPANY _____
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CITY _____ STATE _____
SOLD ONLY DIRECT FROM FACTORY

USE RIGHT BUCKET FOR THE JOB

Hayward makes all three — clamshell, electric motor, orange peel. A Hayward recommendation is unbiased.

Trade HAYCO Mark

THE HAYWARD CO.,
32-36 Dey St., New York

Hayward Buckets

Bridge Has 5 Miles Of Aluminum Railings

The world's longest continuous aluminum bridge railings—5 miles of them—are a feature of the new Penrose Avenue Bridge in Philadelphia. This high bridge over the lower Schuylkill River has a span of 2½ miles and carries a 4-lane industrial highway which now frees the nearby Passyunk Avenue Bridge for local passenger traffic only.

Modjeski & Masters, Harrisburg engineering firm, designed the bridge for the Pennsylvania Department of Highways. Aluminum was chosen for the railings chiefly because it needs no maintenance and will be able to resist the attack of moisture and industrial atmosphere in this shipbuilding and oil-refining section of Philadelphia.

Aluminum Co. of America, Pittsburgh, supplied 125 tons of 61-S aluminum alloy. The railing consists of a 5-inch tube top rail, a 4-inch channel bottom rail, and 1½-inch tube vertical balusters connecting top and bottom rails every 6 inches. Tube expanders lock the balusters to the rails, thus avoiding visible fasteners and possible discoloration from welding. The resulting panels are rigid, and one end of each is free to move with temperature changes. This avoids differential expansion stresses.

A further use of Alcoa aluminum on the Philadelphia project was in the lighting standards placed 200 feet apart on each side of 10 miles of streets leading to the new bridge. These standards, which proved quick and easy to erect, were made by Pfaff & Kendall, Newark, N. J. The contractor who installed them for the City of Philadelphia was W. V. Pangborne & Co., Philadelphia.

Protect Machinery With Stainless Steel

A stainless-steel coating for all metal surfaces, designed to reduce the surface deterioration of machinery and equipment, has been developed by Steelcote Mfg. Co., 3418 Gratiot St., St. Louis 3, Mo. The company reports that this coating can be applied by brush or spray gun at a cost of approximately 4 cents per square foot. It is designed to protect against rust, corrosion, and other types of deterioration caused by salt air and water, industrial atmospheres, alkalis, oils, greases, and most strong acids. The film is noninflammable, odorless, and tasteless when dry. Steelcote is packaged in 1 and 5-gallon containers.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 484.

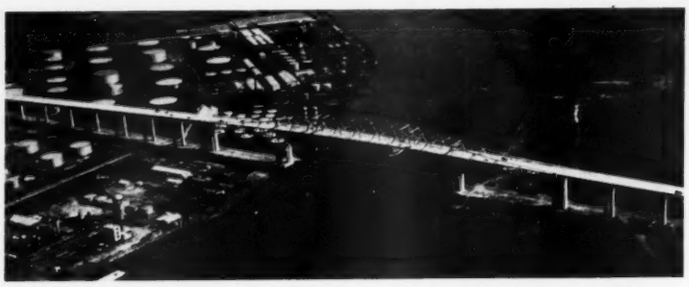
New Diesel Tractor

A heavy-duty diesel tractor featuring high ground clearance has been introduced by American Tractor Corp., 800 Fort Wayne St., Churubusco, Ind. The Terratrac DT-34 is powered by a 4-cylinder Continental GD-157 engine and has electric push-button starting. It weighs approximately 4,250 pounds.

Track gage widths range in sizes from 42 to 72 inches. Twelve-inch track shoes are standard for the DT-34, and 14 and 16-inch shoes are also available. The unit has a new track assembly consisting of heavy-duty links, pins, and bushings, as well as extra-large track rollers and heavy track frames.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 497.

High ground clearance is a feature of the diesel Terratrac DT-34. The unit has push-button starting.



Philadelphia's 2½-mile Penrose Avenue Bridge has the longest continuous aluminum railings in the world—5 miles of them. Lighting standards at 200-foot intervals on each side of the bridge approaches are also of aluminum.

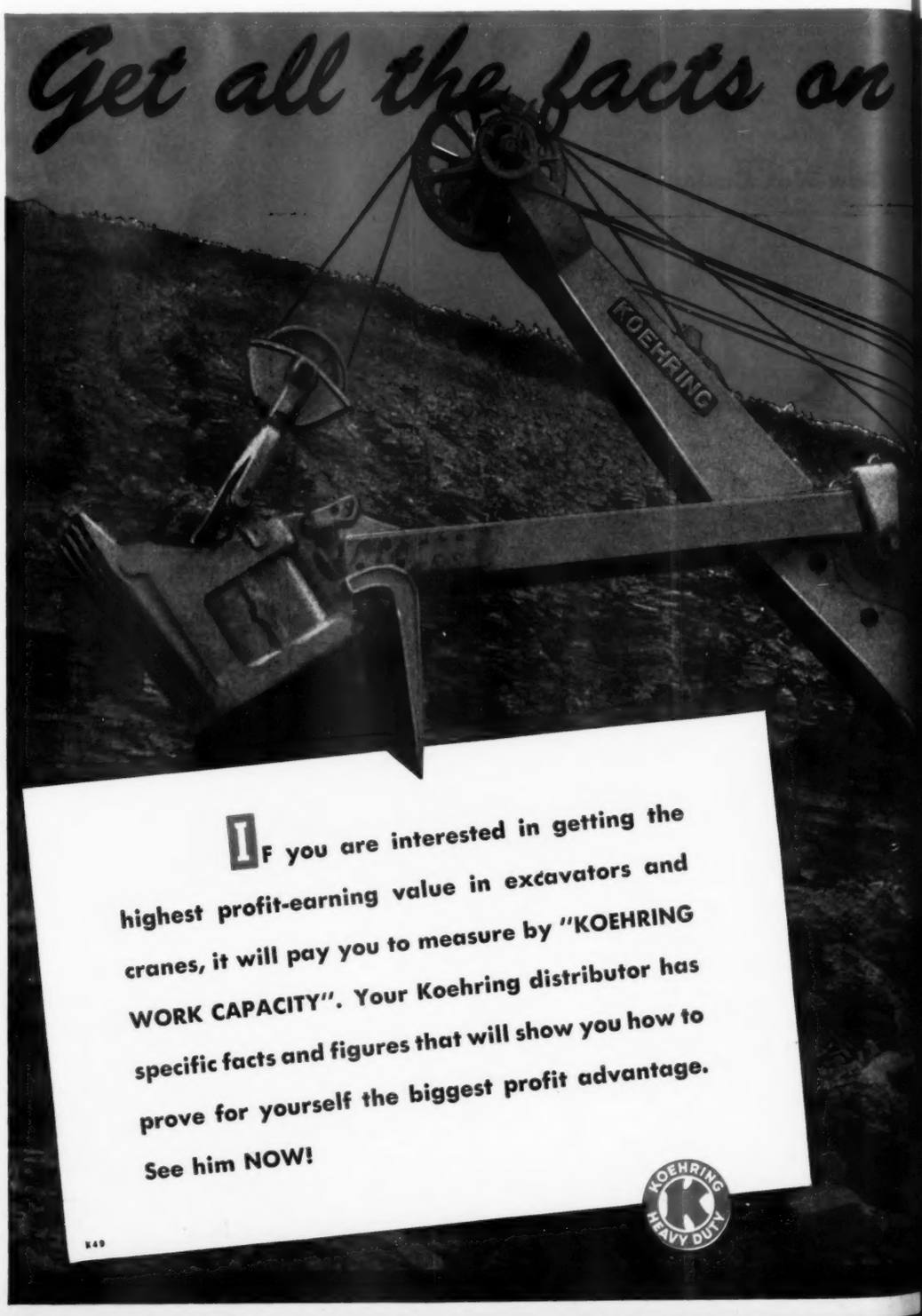
Thruway Authority Appoints Lang Deputy Chief Engineer

The New York State Thruway Authority has appointed, as Deputy Chief Engineer, Conrad H. Lang, a New York State licensed professional engineer. Mr. Lang, whose appointment became effective on January 1, was transferred to his new post from the Utica District Office of the State Department of Public Works, where he had served nine months as Assistant District Engineer. As Deputy Chief Engineer of the Authority, he will coordinate and expedite the design and construction of the Thruway, its bridges, overpasses, and grade-separation structures.

Mr. Lang has been associated with the State Department of Public Works for the past 25 years. He is a member of the American Society of Civil Engineers, past President of the Mohawk-Hudson section of the ASCE, and a member of the National Society of Professional Engineers. He is a member of the Troy City Planning Commission.

Air Reduction Elects V. P.

Joseph H. Humberstone is a vice president of Air Reduction Co., Inc., New York, N. Y. Formerly President of the company's Airco Equipment Mfg. Division, he is succeeded in that capacity by Scott D. Baumer.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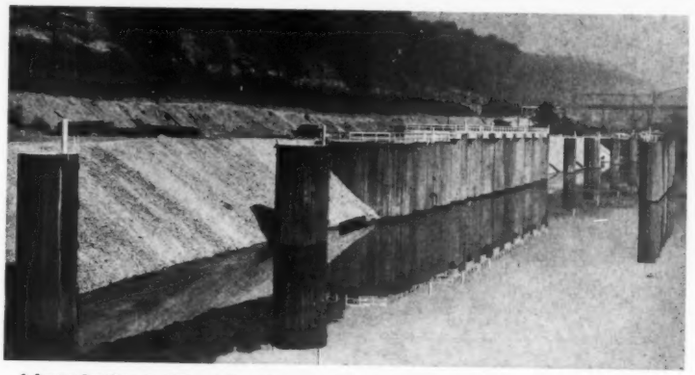
KOEHRING
IF you are interested in getting the highest profit-earning value in excavators and cranes, it will pay you to measure by "KOEHRING WORK CAPACITY". Your Koehring distributor has specific facts and figures that will show you how to prove for yourself the biggest profit advantage.
See him NOW!
K49
KOEHRING HEAVY DUTY

Dravo River Work

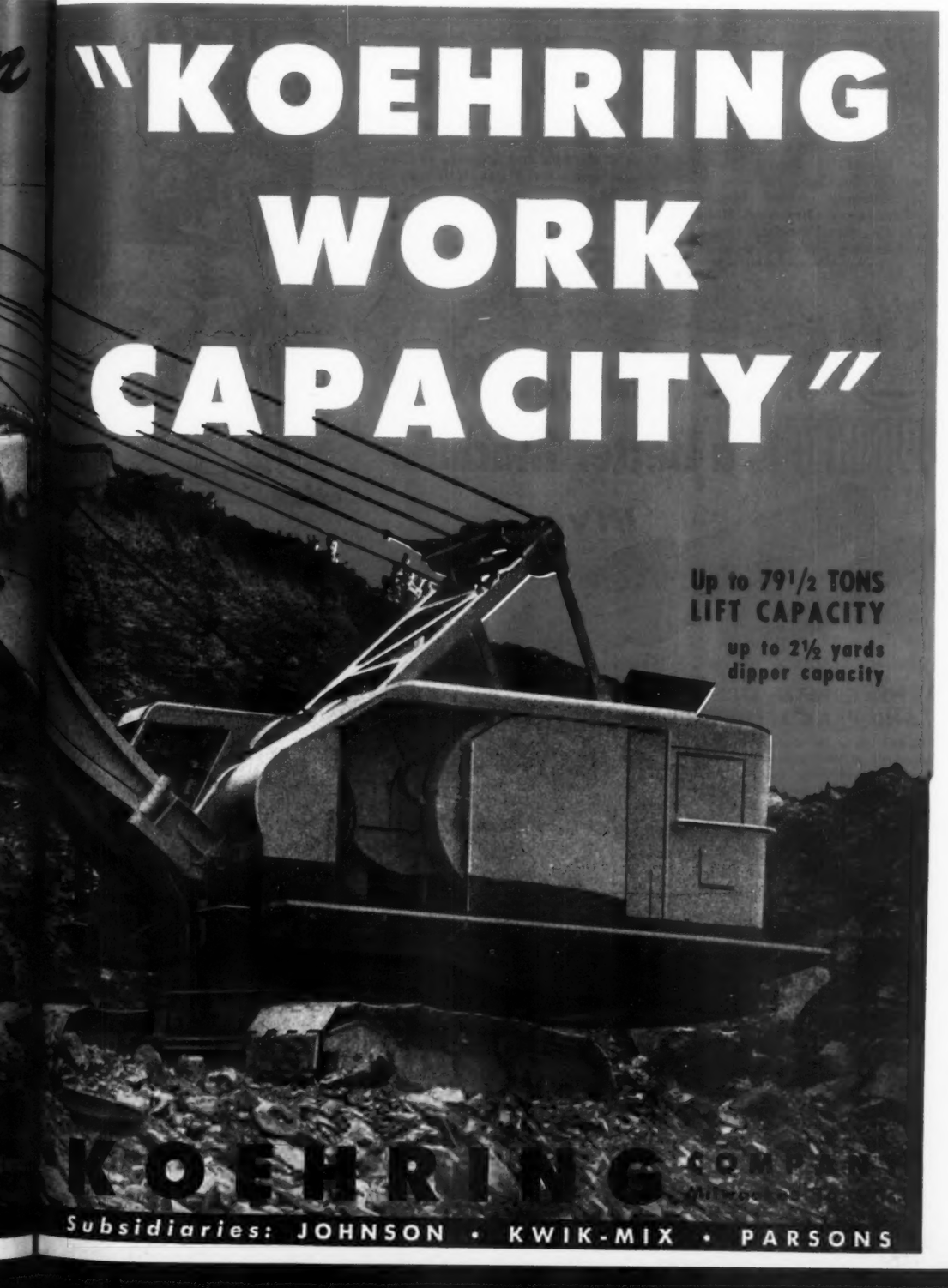
One way of meeting current materials-transportation problems is to make use of inland waterways, and last year many industrial firms turned to rivers as a solution to their difficulties. The Contracting Division of Dravo Corp., Pittsburgh, Pa., reports a busy year of river work. During 1951, it built or repaired about 20 river docks, and an interesting contract scheduled for completion this year is a large dock for the Tennessee Valley Authority at Paducah, Ky.

Another of the firm's 1951 projects was the riverward lock for Monongahela River Lock and Dam No. 2 at Braddock, Pa. This lock-enlargement program is part of the Army Corps of Engineers' plan to improve navigation facilities on the Monongahela River. The second phase of the Lock 2 project is the construction of a new landward lock. Contracts for this and for the renewal of an abutment for Dam 2, Monongahela River, went to Dravo.



A barge-loading facility at the Aliquippa Works of Jones & Laughlin, Pittsburgh, Pa. The Contracting Division of Dravo Corp., Pittsburgh, completed the project in 1951.

Other river projects Dravo completed in 1951 include two bridge substructures—one, consisting of eight piers and two abutments, for the Pennsylvania Turnpike Extension crossing the Allegheny River near Pittsburgh; the other, a new highway bridge over the Delaware River between Morrisville, Pa., and Trenton, N. J. Completion of approximately 25 river-dredging jobs was another part of Dravo's 1951 construction program. This dredging was for the purpose of either improving harbors or clearing the area around water intakes for industrial plants and utilities. In addition to this work, Dravo built an intake to serve the new 2,000,000-ton-capacity open-hearth steel plant of Jones & Laughlin Steel Corp., Pittsburgh, Pa.


"KOEHRING WORK CAPACITY"
Up to 79½ TONS LIFT CAPACITY
up to 2½ yards dipper capacity
KOEHRING
Subsidiaries: JOHNSON • KWIK-MIX • PARSONS

Soil Conservation Challenge

"1952 is a year of promise for the Soil Conservation Society of America", declared Morris E. Fonda on his re-election for the second consecutive term as President of the Society. Mr. Fonda, who is Public Relations Manager of Harry Ferguson, Inc., Detroit tractor and farm-implement manufacturer, spoke at the Sixth Annual Meeting of the Soil Conservation Society. There is no greater challenge, he maintained, than that of leading the way in the intelligent use of the land, water, forest, grass, and wild-life resources of this country.

Continuing his theme, Mr. Fonda cited increasing population, higher standards of living, and at least passable food requirements for all mankind as some causes of the national and international drain on America's natural resources. In urging his fellow scientists to make the Society an aggressive force in "maintaining our land and water resources in the status of permanent production, while we increase the 'vertical' output of the soil", Mr. Fonda stressed that many nonrenewable resources such as ore fields and oil wells are becoming more and more scarce. The proper husbandry of the soil is the only answer to that, said the President. He called for an increase in research facilities to speed up the discovery of new combinations and uses of land crops that will help replace the diminishing nonrenewable resources.

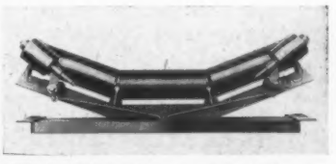
Many of the Soil Conservation Society's past accomplishments—such as grassland, forage-crop, and water-conservation programs—received praise from Mr. Fonda, who concluded his address with a call to members of the Society to reaffirm their basic objective: the advancement of the science of land use.

Belt-Conveyor Carriers

Among the many standard and special belt-conveyor carriers described in a catalog issued by Stephens-Adamson Mfg. Co., Aurora, Ill., is the belt-training carrier shown in the accompanying photograph. This unit can be installed at intervals of 50 to 100 feet on most applications. The training rollers are said to respond immediately to any shift of the belt off dead center, and to tilt the carrier into an angular position with respect to the direction of belt travel. This returns the belt to center and the carrier resumes its normal work position. Edge wear of the belt is negligible with this carrier, according to the manufacturer, and its use is said to eliminate serious belt damage due to improper training.

The catalog contains a complete resume of the company's line. It includes dimensioned drawings and tables of sizes and capacities.

This literature may be obtained from the company by requesting Bulletin 2-C, or by using the Request Card at page 16. Circle No. 492.



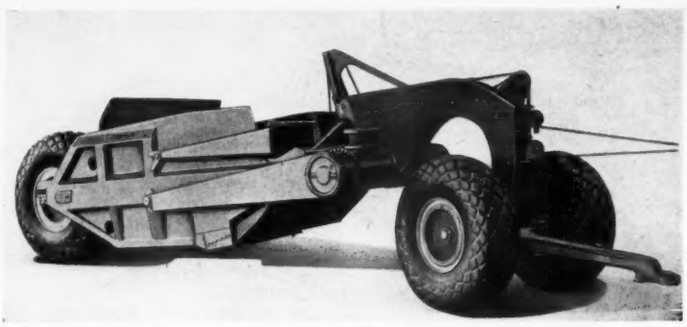
The training rollers of this Stephens-Adamson belt-conveyor carrier respond to any shift of the belt off dead center, and, by tilting the carrier, return the belt to center.

New Tractor-Scraper

A No. 90 scraper, designed to increase earth-moving production when used with D8 tractor power, is announced by Caterpillar Tractor Co., Peoria 8, Ill. Its struck capacity of 21.2 cubic yards can be increased to 25.5 cubic yards with the addition of top extensions or sideboards. Heaped capacity is 27 cubic yards or 31 cubic yards with the sideboards.

The scraper has a hard-surfaced reversible cutting edge. Material is carried in a flat, double-bottom bowl of high-tensile steel. The rig is operated by a cable control unit, which can be mounted on the rear of the tractor to provide for positive loading and ejection.

Tapered roller bearings are installed at each axle. The scraper uses two 24.00 x 29 front tires and two 27.00 x 33 rear tires, all four of 24-ply rating. When loaded, it is said to distribute 60 per cent of the weight on the rear tires. Shipping weight of the unit is 35,100 pounds.



Heaped capacity of the new No. 90 Caterpillar scraper is 27 cubic yards—or 31 cubic yards with sideboards.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 421.

Asphalt Institute Elects

At the Annual Meeting of the Asphalt Institute, New York, N. Y., in December, 1951, the Board of Directors elected officers for the coming year. Bernard E. Gray was re-elected President. Chairman of the Executive Committee is Harold J. Buck, General Sales Manager of American Liberty Oil Co., Dallas, Texas. Vice Presidents for the five geographical divisions are: Division I—John D. Mohler, Jr., Pan-Am Southern Corp.; Division II—D. H. Jenks, Jr., Ashland Oil & Refining Co.; Division III—H. G. Nevitt, Socony-Vacuum Oil Co., Inc.; Division IV—M. O. Huntress, Allied Materials Corp.; Division V—Raymond Harsch, Shell Oil Co., San Francisco.

The following officers were re-elected: Secretary, Herbert Spencer; Treasurer, George R. Christie, Socony-Vacuum Oil Co., Inc.; Assistant Treasurer, John N. Smith, also of Socony-Vacuum. The President, the Chairman of the Executive Committee, the five vice presidents, and retiring Chairman Frank R. Field, Esso Standard Oil Co., constitute the Executive Committee for 1952.

Base-Station Radio Unit

Literature on a de luxe base-station radio unit with a nominal output of 250 watts in the 25 to 50-megacycle frequency has been prepared by Link Radio Corp., 125 W. 17th St., New York 11, N. Y. The circular explains the principal characteristics and specifications of the unit and presents an illustration and a brief description of its features.

The unit is provided with an automatic modulation-limiting circuit—instantaneous in operation—to prevent excessive frequency swings at all times. According to the company, the highly selective receiver will provide at least 100-decibel attenuation of signal 30 kilocycles from the operating frequency. The radio transmitter-receiver Type 250-UFS Ed. 7a-R is a complete assembly design for 2-way communication.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 485.

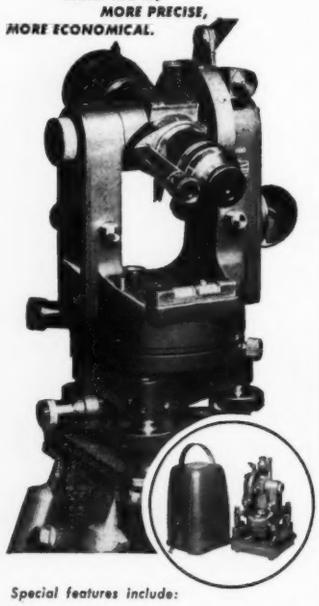
Data on Aluminum Ladders

A folder highlighting the safety features of aluminum ladders has been prepared by Duraluminum Mfg. Co., 110 W. 34th St., New York 1, N. Y. It gives details of their rung construction, siderails, safety locks, and safety shoes, and emphasizes the safety, durability, strength and handling ease of these ladders.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 448.

The FILOTECNICA
6" OPTICAL
TRANSIT-THEODOLITE

The newest and most modern instrument for surveyors and engineers. Its special innovations combine to make instrument operation
MORE RAPID, MORE PRECISE, MORE ECONOMICAL.



Special features include:

OPTICAL PLUMMET—eliminates plumb bob.

OPTICAL READING SYSTEM—vertical and horizontal readings taken at a glance to 6" thru microscope eyepiece next to telescope.

REPEATING LEVER—speeds repetitions, prevents errors.

FULL "BEHIND INSTRUMENT" OPERATION—all operations controlled from operator's position behind instrument.

F/S Model 4150 R weighs only 9 lbs. 14 oz.—stands 10" high. Complete with adjustable-leg tripod and aluminum alloy carrying case, $650.

Full service and repair facilities available.

TRANS-GLOBAL COMPANY
1480 Broadway, New York 18, N. Y.
AMERICAN DISTRIBUTORS FOR—

FILOTECNICA
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S.P.A. Milan

1 of 10 Reasons Why
UNIT is a Better Machine

...FOR GREATER STRENGTH AND PEAK EFFICIENCY

A vital link in the strength, toughness, and durability of UNIT equipment is the use of involute-splined shafts. Compare the 3 shaft drawings and note the superiority of involute splining. In the outmoded, single-keyway shaft, the driving force is concentrated at one point, making it the least efficient and subject to easy breakage or wear. The 10-spline shaft, commonly used in the industry, is a great improvement over the single-keyway — but is still not the most efficient! Involute splining is better able to take the severe beating of daily use. Its multiple splines allow a greater area of contact with the mating member, providing a more equal distribution of driving force under load. As a result, wear is reduced and replacement is seldom necessary. Involute splining requires less tooth-depth, eliminates sharp corners, thus making possible a shaft of greater diameter and strength. Only the advance design of involute splining gives full, peak efficiency — the reason it is used in every UNIT machine.

UNIT CRANE & SHOVEL CORP.
6309 W. Burnham St., Milwaukee 14, Wis., U. S. A.

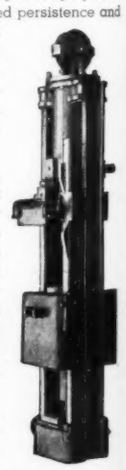
This is the 8th of a series of 10 ads describing outstanding UNIT features.

Crawler and Mobile models — 1/2 and 3/4 Yd. Excavators. Cranes up to 20 tons capacity.

SHOVELS • DRAGLINES • CLAMSHELLS • CRANES • TRENCHOES • MAGNETS

WARRINGTON-VULCAN
Single-Acting
STEAM PILE HAMMERS

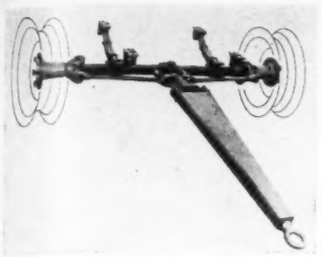
Like bustin' a bronco, taming a tough pile is no soft touch. It takes powered persistence and irresistible impact—tempered action that drives but avoids excess strain on the piling. These are the pile-taming qualities of the Warrington-Vulcan Single-Acting Steam Pile Hammer.



It operates at a medium steam pressure to deliver a moderate frequency of low velocity blows from a relatively heavy ram—effective on wood, concrete or steel piles. It minimizes operating and maintenance costs through rugged strength and simplicity of design, with all working parts exposed for easy accessibility.

Write for details on this dependable pile hammer that has been taming the toughest since 1887.

VULCAN IRON WORKS Since 1852
329 North Bell Avenue
Chicago 12 ---Illinois



The Caravan front-axle assembly has been redesigned for greater stability and maneuverability. It will handle air compressors, heavy-duty generators, pumps, concrete mixers, etc. Capacities: from 10,000 to 12,000 pounds.

Front-Axle Assembly Features New Design

A redesigned front-axle assembly has been added to the Caravan line of four-wheel running gear, announces United Mfg. Co., 46 W. Interstate St., Bedford, Ohio. Heavy over-all construction and 1¾-inch center-arm stops give it greater stability. It has capacities ranging from 10,000 to 12,000 pounds, and is recommended by the company for handling air compressors, heavy-duty generators, pumps, tar kettles, concrete mixers, military field units, and other mobile equipment.

The inside wheel-turning angle of the axle is 35 to 45 degrees, depending upon the model. This wide angle decreases the turning radius for the same wheelbase and track, and increases maneuverability. It also increases the drawbar-turning angle and reduces the possibility of jack-knifing, United says.

Other new features incorporated in the Caravan Model 2-A assembly include a symmetrical steering arm to guard against eccentric loads, a rounded stop boss for line contact with the axle stop, and a heavy flange on the center arm to resist any bending tendency when the turn is stopped. Extra strength has been built into the steering knuckle to resist severe off-the-road strains, and arm contour has been designed to allow a wide turning angle without knuckle and tie-rod yoke interference.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 491.

A Metal Protection For Interior Corners

A metal corner protection for drywall construction has been introduced by The Richkraft Co., 228 N. LaSalle St., Chicago, Ill. Richbead protects both inside and outside corners against damage from sharp objects. It is a metal angle glued to a joint tape, and when installed is said to give a smooth, sharp corner that maintains the finished appearance of walls without getting chipped or banged up.

It comes in 8-foot lengths, with a selection of ½ and ⅝-inch sizes, and requires no special tools for installation; it is placed by using the same cement as for taping wallboard joints. It is said to work equally well under wall paper or paint, and for redecoratting as well as new construction. Any piece of wallboard can be used with it.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 486.

Revised Manual on Valves

A 170-page revised and enlarged edition of the Manual "Equivalent Valves" has been put out by Equivalent Valves Co., P. O. Box 816, Station H, Los Angeles 44, Calif. It compares valves of 18 leading manufacturers by material, type, pressure rating, and structural variations; in all, it lists over 50,000 figures, names, and descriptions. The company claims that this looseleaf manual reduces valve-specification checking to one-tenth the time usually required and should be of help to engineers, purchasing agents, and state and county officials.

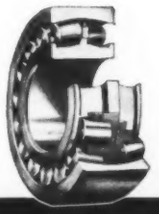
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 493.

Concrete-Form Accessories

Two new bulletins on concrete forming and form accessories have been prepared by Universal Form Clamp Co., 1238 N. Kostner, Chicago 51, Ill. The first, Bulletin SA-65, highlights the features of Universal Uni-Forms, form ties, and accessories. It illustrates the units available and gives comparative cost data. The second, Bulletin SA-33, illustrates and describes form clamping and tying devices, building specialties, and concrete-reinforcing accessories.

This literature may be obtained from the company or by using the Request Card at page 16. Circle No. 412.

handling heavy loads . . .



Torrington Spherical Roller Bearings have the tremendous load capacity needed for reliable performance in heavy-duty construction machinery.

Made from the finest materials, properly heat-treated for long, trouble-free service, these self-aligning bearings have proved themselves both in original equipment and for service requirements.

THE TORRINGTON COMPANY
South Bend 21, Indiana Torrington, Conn.
District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON SPHERICAL ROLLER BEARINGS

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers

Make Budgets and Manpower GO FARTHER with a HUBER MAINTAINER

There isn't a highway or street maintenance problem in the nation that more dollars and more men wouldn't cure.

If either of these limitations is pinching you, don't overlook a few important facts about the Huber Maintainer:

1. It's a 6,000 lb., 42½ H. P. grader with attachments that convert it to a bulldozer, lift loader, mower, broom, snow plow, berm leveler, road planer or patch roller.
2. Its variety of uses keeps it busy every month of the year.
3. It gets around without haulage equipment—covers up to 100 miles in a day.
4. It costs less than half as much as many pieces of maintenance equipment.
5. It needs only ONE MAN to perform its many jobs.

See your nearest Huber Distributor — get an order placed today.

HUBER MANUFACTURING CO. • Marion, Ohio, U. S. A.
Manufacturers of Huber Maintainers, Graders and Complete Line of Rollers

HUBER

Skyscraper Erected On Windswept Plain

Midland, Texas, Strikes Oil and Private Capital Meets the Office-Space Challenge by Building 18-Story Tower

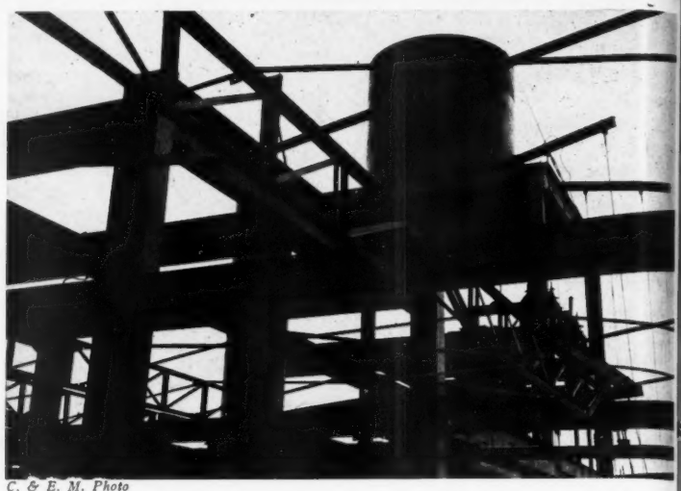
• MIDLAND, Texas, is a city you have to see to believe.

Midland is a fabulous place. Situated in the heart of the Permian Basin of the west-Texas high plains country, Midland is in the middle of everything that's raw and valuable. It's cattle country. It raises sheep. It draws tourists. And they've struck oil.

Midland is a city which Lady Luck placed squarely in the heart of a fast-expanding economy which is drawing oil companies, drill roughnecks, and business firms by the score. There are 25 oil companies in Midland today, and more may follow. Hotel reservations are harder to get than they are in a convention city.

And office space is at a premium, for the fields which were first discovered in 1924 are now being expanded as a frenzy of geophysical activity uncovers new deposits of black gold.

To meet this need for office space, a handsome young Texan only 39 years old, Jack B. Wilkinson, has invested approximately $1,500,000 in the construction of an 18-story skyscraper in the heart of Midland. Wilkinson also owns or controls both the Permian and Wilkinson-Foster Buildings in the heart of town, and the new office tower is built almost adjacent to the other two structures.



C. & E. M. Photo

The exceptionally heavy steel framework of the V&J Tower makes an impressive silhouette, seen from the 18th floor. The penthouse, which was not yet built at the time the picture was taken, rises 6 feet above the level of the water tanks.

Wilkinson has named the building V&J Tower, for his 12-year-old-daughter Virginia Lou and his 14-year-old son Jack B., Jr.

David L. Harmon, general contractor from Odessa, Texas, had the building contract. Wilkinson went to Abilene, a few miles east, to get the consulting-engineer firm of David S. Castle Co. to make the design and inspect the construction.

Tallest Around

V&J Tower is not only an incredibly beautiful building, but is also the tallest in Midland or any city close around. It will likely be a landmark for years for private fliers as they drone over Midland.

The building sticks straight up into space where the wind blows almost constantly. A few nights before CONTRACTORS AND ENGINEERS MONTHLY visited this project, a 120-mile-an-hour gale in nearby Abilene flattened buildings there and did as much damage as the V&J Tower cost. But the new structure will resist even aero-

(Continued on next page)

ULRIX
TRADEMARK

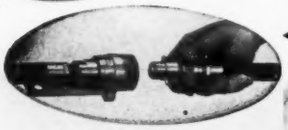
QUICK COUPLERS
For All Hydraulic Lines!

ULRIX **NO ONE COUPLER CAN DO ALL JOBS!** To meet your every hydraulic requirement, Ulrich alone has a full line—14 different models and sizes to solve any problem you may have.

ULRIX **SUPREME IN THE FIELD,** ULRIX Break-A-Way Couplers are the finest ever built. They break and seal both ends of the line ON IMPACT . . . prevent loss of oil and damage to hose. The ULRIX ball check valve is the most practical seal for hydraulic fluid ever developed.

ULRIX **COMPLETELY DIRT-SEALED** so that dirt or dust cannot come in contact with any working parts of the coupler. Where torque is a problem, completely sealed built-in swivels permit the hose to turn under pressure.

ULRIX **THOUSANDS IN USE,** ULRIX Quick Couplers are adapted to a wide range of hydraulic applications.



← CONNECT UNDER PRESSURE WITHOUT TOOLS. A twist of the wrist locks ULRIX Quick Couplers into place automatically.

(Above) CONNECTED (Below) DISCONNECTED

Typical installation is shown at right. Note that couplers are hooked up so that plugs and sockets are in reverse. Thus, when disconnected they are protected against dirt. By following this procedure, you seal both the coupler and the lines from dirt, connected or disconnected; also prevent dangling ends.

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C. & E. M. Photo

Men and materials travel up and down one of the interior elevator shafts of V&J Tower. The platform is raised and lowered by a 2-drum American gas-driven hoist.

C. & E. M. Photo

The wind always blows up here, but bricklayers and stonemasons work in safety, thanks to their guardrailed Patent scaffold.

dynamic forces of that velocity.

Very Heavy Steel

With the exception of exterior masonry and interior trim, V&J Tower is an all-steel building. And what steel! Some of the close-spaced vertical structural columns are 16-inch H-beams, with webs 1½ inches thick, and weigh 284 pounds to the running foot. Some of the reinforcing bars in the heavy beam-type 5-foot-thick concrete footings are 1¾ inches thick. The structural building columns are further stiffened against wind deflection with deep I-beams, some as much as 16 inches through at the base of the building.

Floors are carried on open web-span trusses, which are set on the webs of the wind braces. Corruform metal floor decking supported the concrete for all floor pours. One of the first things Contractor Harmon did was to install all this Corruform after the structural framework was up. Gales howled through the skeleton of a building, and the few loose ends rattled like a Model T, according to the genial building contractor. Finished work ties that down, however.

V&J Tower is completely air-conditioned by Carrier equipment. Interior walls are finished in smooth-troweled white plaster, and the finished floors are asphaltic tile set over the concrete deck. Ceilings are finished in acoustic tile.

The exterior of the building is especially striking. The bands between windows are light-face brick, while the building front and the top coping near the penthouse are finished in green manufactured granite building blocks, which were furnished by Granux Corp. of Chicago. Two rows of the green granite were used in the coping course. Window sash is all metal, and the roof is 2-inch metal-bound gypsum lap decking, furnished by National Gypsum Co.

The building is equipped with two Otis high-speed elevators.

When Contractor Harmon was awarded the job about the middle of 1950, he got busy immediately, buying

(Concluded on next page)

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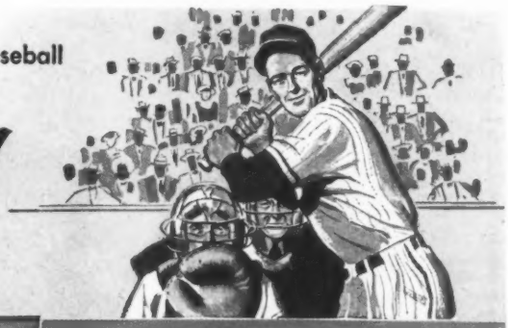

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SINCE 1859—BUILDERS OF CONSTRUCTION EQUIPMENT

Skyscraper Erected On Windswept Plain

(Continued from preceding page)

everything he and his subcontractors would need to finish the structure on schedule. Machinery, cement, even small items like light globes Harmon purchased and stored for use. His subcontractors were not slowed down as a result of this bit of prudent management of Harmon's.

Specialty items which Harmon subcontracted included excavation, which went to Fred Burleson, John F. Beasley Co. of Dallas and Muskogee, Okla., was the steel-erection subcontractor, and this was one of the biggest subbed items. Plumbing and heating went to C. C. White of Albany, Texas, and West Electric Co. had the contract for the electrical work.

Minneapolis-Honeywell received the order for all control equipment, and American Blower Co. fans were used. Midland Concrete Co., a commercial supplier of concrete, furnishing that item, and Mosher Steel Co. of Dallas furnished the steel which the John F. Beasley organization erected. Texas Central Flooring & Roofing Co. received the order for all acoustic and all floor tile.

Construction Not Complicated

Basically, the construction of V&J Tower divided itself quite naturally into three major classifications: (1) excavation; (2) foundation concrete work; and (3) steel erection. Specialty subitems rounded out those three main items of heavy construction.

Excavation had to be carried 35 feet deep below street grade over a 100 x 64-foot area to shape the foundation. Some of the excavation was in rock; as a matter of fact, foundation crews found a caprock outcrop they finally had to pour concrete around because no bit they had would drill it. They wore out 28 ordinary rock bits and failed to penetrate one inch!

Fortunately, no shoring was necessary, since nothing nearby was endangered. Burleson used a 1¼-yard shovel with a fleet of 6-yard dump trucks to dig the material out and haul it away. Where drilling and powder were necessary, the drilling was by jackhammer and, with the exception of the rock they couldn't drill, was of a minor nature.

Foundations for the 4 rows of steel upright columns consisted of 5-foot-thick reinforced beam slabs, some shaped like crosses with four columns at the extremity points. These were formed and poured by truck mixers, which chuted the concrete down wherever possible.

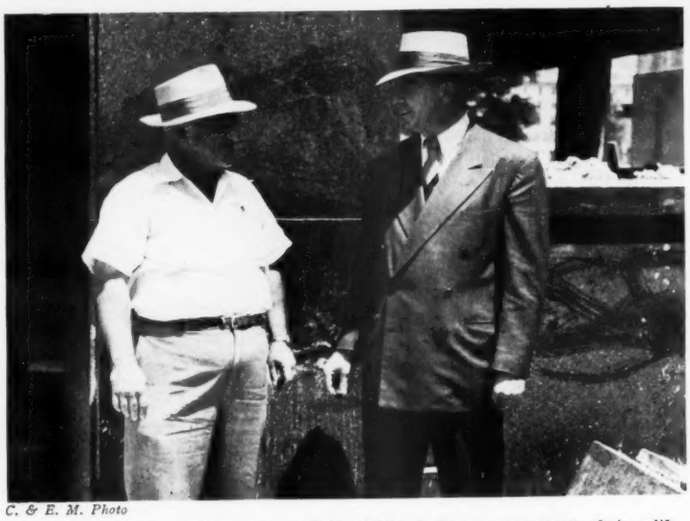
The heaviest, most dangerous job of all was the erection of structural steel. Harmon had the steel arriving on the site January 2, 1951, after completing the foundation during the fall of 1950. Beasley's men arrived with a Koehring crane and 165 feet of boom and started setting steel.

The enormous reach of the heavy crawler crane let them set the first 11 floors. The members were set from the center outward so the boom would always be able to reach any point in the area. The Corruform form sections were installed as soon as the structural steel was up, to act as a floor for the riveters and heater men.

The upper part of the building beyond the 11th floor had to be erected with a stiffleg derrick and a Chicago boom. One of the last things to be erected was a 1,000-gallon water tank high in the top of the building, only 6 feet below the level of the upper penthouse.

Harmon used one of the interior elevator shafts to raise men and materials to the various floors. A tubular elevator guide frame was welded to the building members, and the elevator platform was raised and lowered by a 2-drum American gas-driven hoist. The green granite blocks were crabbed up by hand hoist, and each block was firmly anchored to the building by a ⅜-inch tie rod, which ties into the block and welds to the building structural members.

The new tower was scheduled for completion by November 1, 1951, and oil companies which have made Midland their central headquarters for the west-Texas area were beginning to move in. Wilkinson, the building owner, will also have all of his offices centrally located in the new tower building.



C. & E. M. Photo

Jack B. Wilkinson (right), owner of the Midland, Texas, skyscraper, chats with David L. Harmon, contractor on the V&J Tower project.

Timken Promotes Cook

Robert E. Cook now fills the position of Sales Engineer (Cleveland office) of the Steel and Tube Division of The Timken Roller Bearing Co., Canton, Ohio. Mr. Cook, who joined Timken in 1939, was Field Engineer with the Cleveland office prior to his present appointment.

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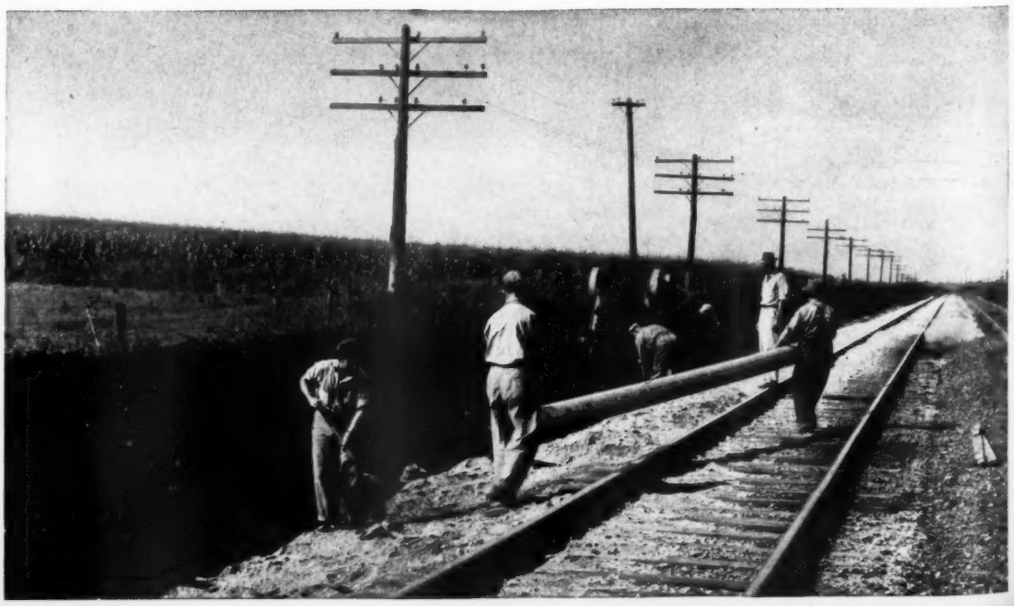

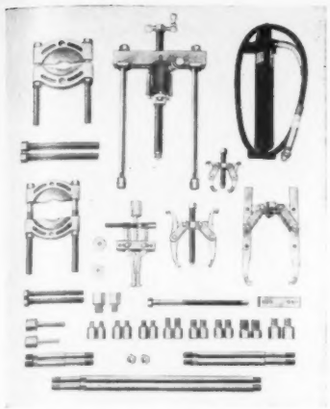

OTC set No. CI-644 consists of Caterpillar tractor service tools for use with the Power-Twin hydraulic puller.

Service-Tool Set

A set of Caterpillar tractor service tools for use with the new OTC Power-Twin hydraulic puller, a 17½-ton hydraulic ram, is announced by Owatonna Tool Co., 381 Cedar St., Owatonna, Minn. Set No. CT-644 includes pullers, adaptors, and attachments.

The Power Twin is said to take the hard work out of pulling and installing operations involving gears, bearings, sleeves, pulleys, shafts, sprockets, bearing outer races, bushings, etc. It eliminates torque and does jobs 75 per cent faster than screw-operated pullers, the manufacturer claims. A 30-ton ram also adaptable for use with standard OTC pullers is available.

Further information may be secured from the company by requesting Catalog No. CT-52. Or use the Request Card at page 16. Circle No. 402.

Data on Plaster Fireproofing

An enlarged 18-page edition of "Vermiculite Plaster Fireproofing" has been issued by Vermiculite Institute, 208 South La Salle St., Chicago 4, Ill. It presents an up-to-the-minute summary of fire tests on construction assemblies protected by vermiculite plaster, and presents illustrations and drawings of typical fireproofing details.

Three points brought out and explained in detail in the booklet are these: ceilings attached or furred to the bottom of primary members obtain the same fire rating as suspended ceilings; ceilings, whether attached, furred, or suspended, may be used to protect primary as well as secondary members —in other words, individual fireproofing of primary members is not necessary; ceiling openings within the area limits indicated do not affect the fire-resistance value obtained by a similar ceiling with no openings.

This literature may be obtained from the Institute, or by using the Request Card at page 16. Circle No. 494.

Findlay West-Coast Manager

A. M. Guthrie has rejoined the Findlay Division of Gar Wood Industries, Inc., Findlay, Ohio, as District Manager on the west coast. His area includes California, Washington, Oregon, Utah, Arizona, Nevada, Montana, Wyoming, and Idaho. In this territory he will handle the Gar Wood line of Tipdozers, Dozecasters, and scrapers for Allis-Chalmers wheel tractors, and the Buckeye line of ditchers, Hiway wideners, crane-shovels, spreaders, and Finegraders.

Mr. Guthrie was Eastern District Manager (and later Sales Manager) of the Buckeye Traction Ditcher Co. from 1940 to 1947. In the interval he has been engaged in the manufacture of material-handling and construction equipment and for the past three years has managed an equipment-distributing house in Pennsylvania.

Road-School Proceedings

The proceedings of the 37th Annual Road School held at Purdue University on March 26-29, 1951, have been published by the University's Engineering Extension Department. Engineering Bulletin, Extension Series No. 77, is compiled and edited by Ben H. Petty, Professor of Highway Engineering. It contains papers read at the sessions, complete with illustrations and diagrams.

Subjects covered in the papers include: the New Jersey Turnpike, safety, state-county-city relations, county road problems, citizens' cooperation in road-improvement plans, load tests in Maryland, effect of coarse aggregates on concrete pavement, highway drainage, and specifications required in road and bridge maintenance.

"Proceedings of the 37th Annual Road School" may be obtained by writing to Purdue University, Engineering Extension Department, Lafayette, Ind.

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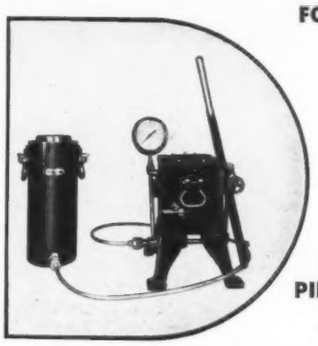

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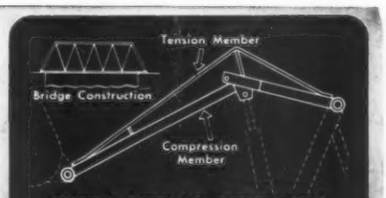

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Test Piles Checked With Hydraulic Jack

Pier Foundation Design for New Viaduct Is Based on Test Pile Data With Hydraulic Loading

• DEPARTING from traditional dead-loading of test piles, a St. Joseph, Mo., contractor used hydraulic-jack pressure with unusually accurate results to determine pile lengths for the new $1,133,816 viaduct in the Missouri city. Bushman Construction Co. is the contractor. The new viaduct, which will relieve a serious traffic problem at the east end of the Missouri River bridge, was designed by engineers of the Missouri State Highway Department, working with Howard, Needles, Tammen & Bergendoff, consulting engineer at Kansas City and New York, who prepared the detail plans.

The test problem came up when the Missouri Highway Department specified 132-ton bearing tests on six piles, instead of the routine 50-ton loads imposed in the past. R. C. Jensen, General Superintendent for Bushman, and himself an experienced bridge builder, worked through his company to try the hydraulic-jack method which has seldom been used in the state of Missouri.

Jensen first played with the idea of using a 100-ton and a 60-ton jack the company had on hand. He intended to hook them together to a common gage, and use both jacks to put on the load. Since there was considerable calculation and the possibility of error present, the engineers favored a single jack. Jensen hustled around and found a 250-ton Watson-Stillman rig in the yard of Kansas City Bridge Co., one of Bushman's competitors. The firm cooperated, and the big 250-ton jack made the tests.

C. & E. M. Photo

Missouri Highway Department engineer Charles Dew takes notes while a 250-ton hydraulic jack applies pressure on a concrete test pile for the St. Joseph viaduct.

Wood Piles Hold Thrust

Eight wood piles in clusters of four at each end of a 20-foot steel 33-inch WF jacking beam, took the upward thrust from the jack. The wood piles, like the concrete test sections, were driven by a Northwest crane with a 60-foot boom, a set of portable leads, a No. 1 Vulcan steam hammer, and a small upright boiler. The test piles were about 45 feet long, with wood piles the same length, driven to a penetration of about 40 feet. The upper part of the wood piles was notched to take the 6 x 8-inch oak cross timbers which were bolted to the pile notches over the 33-inch double steel jacking beam.

Gratifying accuracy was obtained, according to field engineers connected with the project. It took a week to complete the test on one pile.

The big jack was set on the head of the concrete test pile, with its upper part resting against the steel jacking beam. At the point of contact, a special bar for measuring the pile deflection was installed. It consisted of a heavy steel strap which fastened around the test pile, with two measuring arms extending at right angles from the pile. One arm had a pointer which read the deflection directly from a machinist's ruler set against a 2 x 4 stake driven independently into the ground. The other pointer was arranged so that it recorded three times the deflection on a similar ruler on the opposite side. The pointers were carefully set to zero on the rulers just before hydraulic pressure was applied to the jack.

The tests were made by placing 22 tons on the pile initially, and maintaining that pressure for 6 hours. Then the tonnage was boosted to 44, and the pressure was maintained for 12 hours. The load was then increased to 66 tons and held for 6 hours, after which an 88-ton load was put on and maintained for 48 hours. Usually up to that point nothing much happened.

The pressure was then released for about 3 minutes, and the rebound measured. Then the pressure was increased to 110 tons; this was held for 48 hours. Following that, there was another 3-minute break with the pres-

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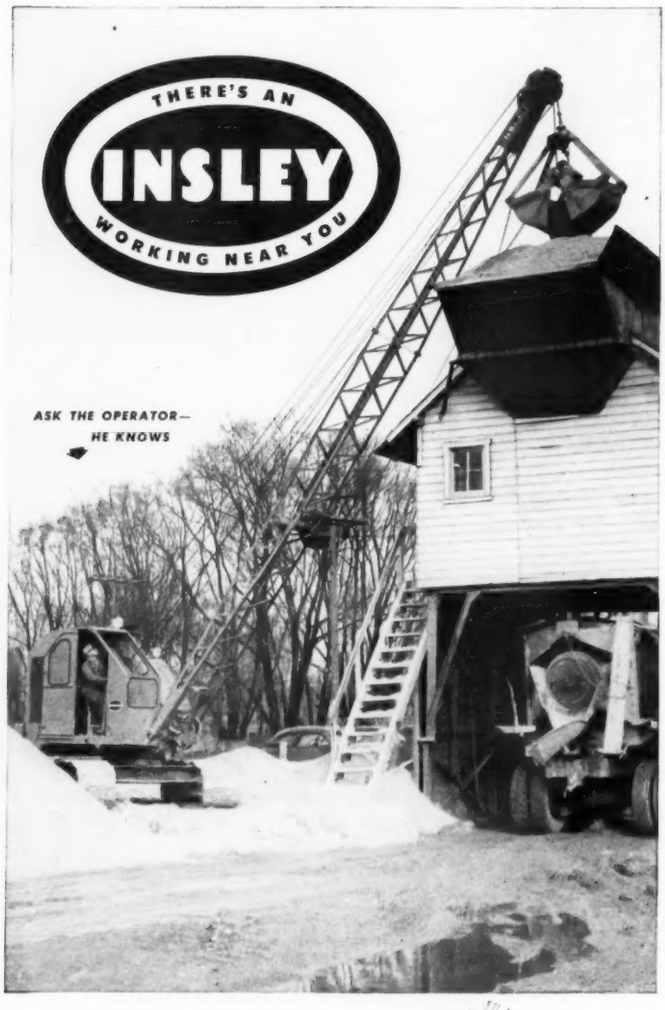

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sure released, and the final 132-ton ultimate pressure was put on and maintained for 48 hours.

The principal deflections, of course, occurred as the ultimate test load was reached. One of the six test piles held the 132-ton load without deflection, but the other five sank from a fraction of an inch to 3½ inches. The test piles were driven to bearings around 30 tons, calculated according to the formula

$$P = \frac{2WH}{S + 0.1W} \quad \frac{w}{}$$

— where w equals weight of pile in pounds and W equals weight of striking parts of hammer in pounds.

Behavior Charts Made

Careful field notes, made by the state and contractor representatives present day and night, were plotted on individual charts. The deflection points when joined together gave an extremely accurate curve which showed the rate of deflection under various loads. Pile lengths could then be calculated for the various soil strata across the viaduct, and the contractor notified what lengths to precast. Since there are 22 piers and over 500 units of concrete piles in the project, a considerable saving of money and sound bearing conditions for the new viaduct was expected.

One thing was sure: the bearing piles were to be precast reinforced-concrete units. The test piles which were involved in the tests were 16 inches square at the top, and tapered gradually to a 10-inch-square bottom. There was a final taper to 8 inches in the last foot, to make driving a bit more accurate. Indications were that the concrete piles would have to be from 40 to 60 feet long for the foundation.

The studies which were made could be appreciated fully if one stood around the pile driver and watched one of the test piles go down. The entire area is part of the ancient Missouri River bottom, and engineers could expect everything from silty blue clay to clean river sand. Some of the test piles sank 9 feet deep through the foundation material

(Concluded on next page)

C. & E. M. Photo

Jess Foster pumps the jack which applies pressure to the concrete test pile. Notice the cross bracing of the wood piles which hold the test-load beam.

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OHIO—The W. W. Williams Co., 914 Main St., Cincinnati; 18301 Brookpark Rd., Cleveland 11; 835 W. Goodale Blvd., Columbus; 1260 Conant St., Maumee.
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OREGON—Howard-Cooper Corp., Highway 99E, P. O. Box 433, Albany; Highway 99, P. O. Box 86, Central Point; P. O. Box 1, Coquille; First and Van Buren, Eugene; 5821 N. E. Gilsan St., Portland 13; 228 E. 2nd Ave., S., Roseburg.
PENNSYLVANIA—The Capitol Equipment Co., 5100 Paxton St., Harrisburg; Alan A. Wood, 1649 N. Broad St., 905 Hardt Bldg., Philadelphia; Dravo-Doyle Co., 2501 Preble Ave., N.S., Pittsburgh 12.
RHODE ISLAND—Parker-Danner Co., 139 Allens Ave., Providence.
SOUTH CAROLINA—South Carolina Equipment Co., 444 Gadsden St., Columbia.
SOUTH DAKOTA—Sioux Road Equipment Co., 500 E. Sixth St., Sioux Falls; Box 941, Rapid City.
TENNESSEE—Wilson-Wessner-Wilkinson Co., 202 W. Morelia Ave., Knoxville; Tri-State Equipment Co., 124 E. Calhoun Ave., Memphis; Wilson-Wessner-Wilkinson Co., 310 S. 2nd St., Nashville.
TEXAS—Alamo Iron Works, Brownsville; Corpus Christi; Tri-State Equipment Co., 500 E. Overland St., El Paso; Conley-Lott-Nichols Machinery Co., 1311-19 S. Ervay St., Dallas 1; 3601 Avenue "H," Lubbock; Tri-State Equipment Co., P. O. Box 472, Odessa; Alamo Iron Works, Santa Clara & Montana Sts., San Antonio 6.
UTAH—Kimball Equipment Co., 222 W. 17th St., S., Salt Lake City 10.
VIRGINIA—Hampton Roads Tractor & Equipment Co., W. 39th St. and Killam Ave., Norfolk; Natural Asphalt Corp. of Virginia, 1901 Hamilton St., Richmond.
WASHINGTON—Glenn Carrington & Co., 91 Columbia St., Seattle 4; Howard-Cooper Corp., 5045-55 - 4th Ave., S., Seattle 8; Intermountain Equipment Co., 611 E. Sprague, Spokane.
WEST VIRGINIA—West Virginia Tractor & Eq. Co., P. O. Box 473, Charleston; P. O. Box 587, Clarksburg.
WISCONSIN—The Stone Manufacturing Co., 321 N. 25th St., Milwaukee 3; Badger Equipment Sales, Inc., Route 2, Thiensville.
WYOMING—Studer Tractor & Equipment Co., East Yellowstone Highway, Casper.
ALASKA—Glenn Carrington & Co., c/o Westward Hotel, Anchorage.
CANADA—Mussens Canada, Ltd., Church St., New Brunswick, Fredericton; Coleman Machinery Co., Ltd., 101 Upper Water St., Nova Scotia, Halifax; Mussens Canada, Ltd., 65 Colborne St., Montreal 3; Ontario Equipment & Supply, Ltd., 111 Merton St., Toronto, Ontario; Frost Machinery Co., Ltd., 971 Erin St., Winnepeg, Manitoba; International Agencies & Machinery Co., 2315 Cambie St., Vancouver, B. C.; Mussens Canada, Ltd., Charest Blvd., Quebec.

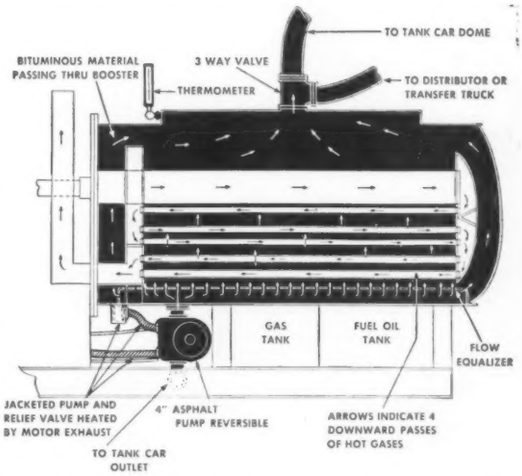
HOT BITUMEN FROM TANK-CARS

4 times as fast with

a Cleaver-Brooks PORTABLE PUMPING BOOSTER

The inside reason for fast operation:

Cleaver-Brooks Pumping Boosters pump, heat, and circulate bituminous material in one operation. Heating is provided directly, without use of steam, by pumping from tank-car (or storage tank) through the heating element of the Booster and back into tank-car. Entire contents of tank-car need not be heated as in one pass through the Booster, bituminous materials are heated to application temperatures and delivered to distributor, transfer truck, or storage tank; circulation of material while heating prevents separation and assures uniform application. No water or steam required for operation.


TO TANK CAR DOME
BITUMINOUS MATERIAL PASSING THRU BOOSTER
3 WAY VALVE
THERMOMETER
TO DISTRIBUTOR OR TRANSFER TRUCK
GAS TANK
FUEL OIL TANK
FLOW EQUALIZER
JACKETED PUMP AND RELIEF VALVE HEATED BY MOTOR EXHAUST
4" ASPHALT PUMP REVERSIBLE
ARROWS INDICATE 4 DOWNWARD PASSES OF HOT GASES
TO TANK CAR OUTLET

Built by the pioneers and originators of pumping boosters:

Cleaver-Brooks Pumping Boosters are available in two sizes (No. 1 heats 10,000 gal. car 35° — 45°F. per hour; No. 2 heats 10,000 gal. car 55° to 65°F., per hour); both sizes obtainable skid-mounted or trailer mounted. Cleaver-Brooks are pioneers and originators of pumping boosters and tank-car heaters — have designed and built this equipment for more than 20 years — many original models are still in action — rendering efficient service.

Get complete information — send for bulletin

CLEAVER-BROOKS COMPANY
Dept. B, 396 E. Keefe Ave., Milwaukee 12, Wis.

Send for bulletin "Cleaver-Brooks Pumping Boosters" for complete information and specifications.

BUILT WITH THE FAMED
FOUR-PASS HIGH EFFICIENCY DESIGN OF

Cleaver-Brooks
STEAM BOILERS

Test Piles Checked With Hydraulic Jack

(Continued from preceding page)

from their own 5-ton weight and the hammer's weight alone. To see that happen, and then to see the bearing values tighten up when the pile penetrated favorable material, gave the observer an appreciation of engineering as an exact science.

The hydraulic-jacking method, compared to dead-loading with water or sand, turned out to be faster, easier, and equally accurate so far as test data were concerned.

An Important Viaduct

The viaduct on which this test work was done was one of Missouri's important construction projects for 1951. For years a serious traffic bottleneck has existed where U. S. 36 and 59 drop down off the Missouri River bridge into St. Joseph. The new viaduct will still let the automobiles drop down into the city, but it will carry through traffic across to 9th Street and away from the traffic-congestion point.

The viaduct really consists of four separate bridges, connected by embankments, with a north approach ramp and two access ramps near the center. The entire structure will span 4th Street, the C. B. & Q. railroad tracks, 6th Street, the wide terminal railroad yards, 8th Street, and 9th Street.

The 4th Street, C. B. & Q. railroad, and 9th Street bridges are to be 3-span deck-girder structures. The long structure across 6th, 8th, and the railroad terminal yards is to be a 9-span continuous plate-girder affair, with I-beams in the first span. The finished roadway width of 4th Street and the C. B. & Q. structures will be 52 feet. The roadway for the other two structures will be 28 feet.

The contractor is moving ahead on the structure and expects to have the viaduct ready for use sometime late in 1952.

Personnel

All Bushman Construction Co. field operations are under the supervision of R. C. Jensen, General Superintendent.

For the Missouri State Highway Department, project officials include Resident Engineer L. H. Williams, Division Engineer L. M. Hoskins at St. Joseph, Engineer of Bridges V. W. Enslow, and Chief Engineer R. M. Whitton.

Detachable Cab Now Available for Loader

An all-weather detachable cab for the Hough Payloaders is now manufactured by Campbell Detachable Cab Co., Wauconda, Ill. With tubing as the structural frame, the cab is said to be both lightweight and roomy. Its window arrangement provides full visibility, while the operator is protected by a safety glass windshield. A safety plate window in the top permits him to see the bucket when it is in the dumping position. Mounting and dismounting the cab is said to be a matter of minutes.

Further information on the detachable cab may be secured from the company. Or use the Request Card at page 16. Circle No. 509.

Film on Snow Melting

"A Winter Wonder" is the title of a new sound film made available to technical and professional groups by A. M. Byers Co., Clark Bldg., Pittsburgh, Pa. The 9-minute presentation on concealed snow-melting systems traces their development and explains what they are, how they are installed, and what they do. Pictures taken during 1950's record-breaking snows depict the snow-melting systems in operation.

Copies for showing are offered without charge. Arrangements for obtaining the picture may be made through the company's main office in Pittsburgh, or through branch offices in Atlanta, Boston, Chicago, Houston, New York, Philadelphia, St. Louis, San Francisco, and Washington.

Decal Company Expands

A heavy schedule of war contracts is one reason why Miracle Sign Co., Wichita, Kans., manufacturer of decals, is undertaking an expansion of its plant at 734 S. Washington. Among its customers is Boeing Airplane Co.

Universal Atlas Promotes

Several executives of Universal Atlas Cement Co., New York, N. Y., are taking higher positions in the company. George H. Reiter, formerly Vice President and General Sales Manager, fills the newly created post of Executive Vice President. Fred T. Wiggins, who was Vice President and Assistant General Sales Manager, succeeds Mr. Reiter as Vice President and General Sales Manager.

Mac H. Hull, James C. McClure, and David H. Deacon also received promotions early this year. Mr. Hull, formerly Assistant to the Vice President, and Mr. McClure, former Sales Manager of the company's Dayton, Ohio, branch office, are both Assistant Vice Presidents with offices in New York City. Mr. Deacon, former Assistant Sales Manager at Dayton, succeeds Mr. McClure as Sales Manager in that territory.

Mr. Hull joined Universal Atlas in 1921; Mr. McClure in 1927; and Mr. Deacon in 1941.

Everybody Says OK

PERMITE CONCRETE CURING COMPOUNDS

All three types of Permite Concrete Curing Compound meet or exceed the specifications of most cities, counties and states, all the Federal Agencies, the Corps of Engineers, U. S. Army, and the Department of the Navy.

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STATE
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● DISTRIBUTORS IN MAJOR CITIES FOR QUICK SERVICE.

Three Permite Curing Compounds

PERMITE
CONCRETE CURING COMPOUND

PERMITE W-95
Concrete Curing Compound — for curing of horizontal surfaces.

PERMITE V-167
A Resin Base Concrete Curing Compound for horizontal surfaces.

PERMITE V-169
A Resin Base Concrete Curing Compound for architectural or vertical concrete surfaces where non-discoloration is important.

ALUMINUM INDUSTRIES, Inc.
Cincinnati 25, Ohio

Write for Catalog data and Distributor's name.

A Few Good Distributor Territories Open!

Now—more than ever!

smith

the *money-saving*

COMPRESSOR

smith MODEL 105-P

Lower first cost! Lower upkeep!

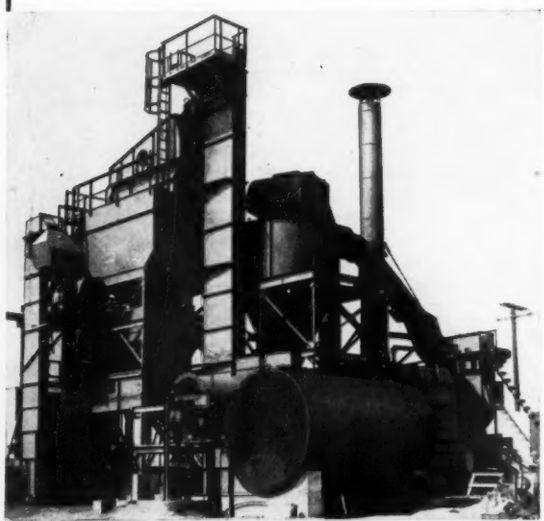
In high-cost times, look to the Smith for compressor savings! Delivers 105 cu. ft. per minute—combines heavy duty with light weight; easily portable. Powered with the Chrysler Ind. 15 Industrial engine — 6 cyl., 4" bore, 5" stroke, 377 cu. in., 3" crankshaft, 7 main bearings, sodium cooled valves and Stellite valve seats for heavy duty, long life. Compressor valves—stainless steel disc type with Manganese Bronze seats. Improved type pilot valve and simplified control . . . *Write for literature and prices.*

ALSO the new SMITH 70-P AIR COMPRESSOR

Gordon Smith & Co.
Incorporated
483 College Street
BOWLING GREEN, KY.

100 TONS PER HOUR CONSISTENT PERFORMANCE

CUMMER ASPHALT PLANTS



Showing complete plant with dust elevator and dust collection unit

- Capacity—100 tons per hour guaranteed (based on 5% initial water content, dried to within ½ of 1% and heated to 350 to 400 degrees Fahrenheit).
- Mixing tower with vibrating screens and mixer.
- Enclosed cold and hot elevators.
- Equipped with cold storage bin and feeder.
- Internal combustion with low pressure burner equipment.
- Dust collector discharging reclaimed dust into hot elevator.
- Power—diesel or electric.
- Plant is complete with all motors and starter switches.

Other sizes from 50 to 100 tons per hour (complete drying and mixing units) available.

PROMPT SHIPMENT OF ALL SIZES
Feeders — Storage Bins — Pumps — Timers

Catalog sent on request

THE F. D. CUMMER & SON COMPANY
Builders of Fine Asphalt Plants
1827 EAST 18th STREET, CLEVELAND 14, OHIO, U.S.A.

Notice Junior's look of absorption? He's a catskinner at last, in this electric-powered replica of the Caterpillar D4 tractor. Travel speed: 4 mph.

Boy-Sized Tractor Has Own Power Unit

If you've got a young catskinner in the family, you may be interested in the new electric crawler tractor offered by Mystic River Sales Co., P. O. Box 312, Mystic, Conn. A replica of the Caterpillar D4, it will steer, veer, gear, and even has reverse. Safe for any child, the toy moves only while the operator holds his foot on the pressure switch, and stops in a few feet when the pressure is released.

The boy-sized crawler is available with working dozer blade, dump trailer, and headlight. It can climb, turn in its own length and travel at speeds up to 4 mph. Powered by an ordinary 6-volt auto battery, it runs 3 hours steady playing or 6 hours of average playing time. The battery can be recharged with a unit available from Mystic Sales. The new toy is constructed of an all-steel welded box-type frame and its body is painted bright Caterpillar yellow.

Further information may be obtained from the company. Or use the Request Card at page 16. Circle No. 503.

New Swing Scaffold

An all-metal swing scaffold, consisting of gear-type winches and a trussed steel stage with a work area of expanded metal, has been developed by Bil-Jax, Inc., Archbold, Ohio.

The winch has a load capacity of 1,000 pounds and a drum capacity of 75 feet; it is equipped with 75 feet of steel cable, and its brake is automatic for safety. The standard stage is 30 inches wide and 20 feet long, and requires two winches. No planking is needed, as the work area is expanded metal. Standard equipment with each stage includes two adjustable caster wall guides, four 40-inch guardrail posts, and two 20-foot guardrails.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 439.

The new Bil-Jax swing scaffold consists of two gear-type winches and a trussed steel stage with a work area of expanded metal.

Whiteprinting Outfits

An informative 4-page bulletin on Spee-Dee whiteprinting outfits has been issued by Peck & Harvey, 5736 N. Western Ave., Chicago 45, Ill. It describes and illustrates portable units to produce sharp black, blue, maroon, or sepia-line positive prints by the moist-diazo (semidry) or the ammonia-fume (dry) method. They are available in three sizes, accommodating prints up to 12 x 18, 18 x 24, and 24 x 36 inches.

The bulletin also gives helpful facts about the whiteprinting process and suggestions about printing and developing for speed, economy, and utility.

This literature may be obtained from the company by requesting Bulletin 154, or by using the Request Card at page 16. Circle No. 459.

Bulletin on Fastening Tools Presents Application Ideas

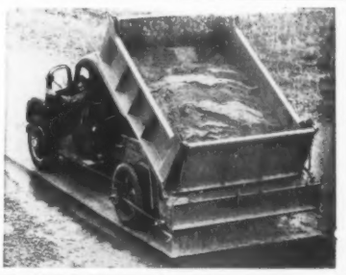
A 4-page folder issued monthly by the Powder Power Tool Corp., 0719 S. W. Woods St., Portland 1, Oreg., highlights the latest applications of Drive-It fastening tools. This bulletin is offered regularly to men in the construction industry. It gives details on methods of construction and techniques, along with on-the-job photographs. Each issue is devoted to one or more specific applications of the tool on some current job. Cost and time analyses often accompany problem-solution treatment of the job.

C&EMonthly readers may be put on the mailing list for this bulletin by writing to the company, or by using the Request Card at page 16. Circle No. 447.

Do your sealcoating and ice control jobs the fast easy Swenson way. Spreads salt, chloride, sand or cinders any width or amount desired.

Free Information

Swenson Spreader & Mfg. Co.
Lindenwood, Illinois



CP Hicycle Saws have 55° bevel adjustment for angle cuts; blade speed won't sag . . . reserve power makes heavy cuts easy, blades require fewer sharpenings or replacements.

CP Hicycle Vibrator can be used anywhere within a 400-foot radius without moving generator. The motor is in the vibrator head—no flexible shafting is used. Vibrating frequency 10,000 V.P.M.

CP Hicycle Wire Brush Machine, also used for grinding and sanding.

HICYCLE ELECTRIC TOOLS for

HEAVY-DUTY SERVICE

with low maintenance

Developed to meet heavy industry's production line demands for continuous service on a three-shift basis, CP HICYCLE ELECTRIC TOOLS are equally efficient and economical on construction jobs.

They operate on 180-cycle, 3-phase, 220-volt current, and are powered by a light, inexpensive, gasoline-driven portable generator, which can be carried easily from one location to another by one man.

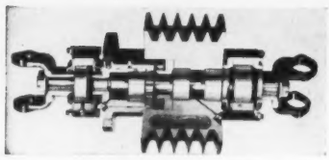
More powerful and more rugged than ordinary electric tools, HICYCLE TOOLS maintain speed under load. Maintenance is remarkably low because high speed, squirrel cage induction motor has no brushes to replace, no armature to burn out.

DRILLS
WOODBORERS
NUT RUNNERS
CIRCULAR HAND SAWS
GRINDERS
SANDERS
CONCRETE VIBRATORS
EXHAUST VENTILATORS

Write for detailed information.

CHICAGO PNEUMATIC TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



The new Davey P-80 power takeoff fits all standard motor trucks.

New Power Takeoff

A packaged heavy-duty power takeoff to fit all standard motor trucks is announced by Davey Compressor Co., N. Water St., Kent, Ohio. The Davey P-80 is said to transmit full engine power to the driving of heavy-duty truck-mounted equipment. It is 18 inches long and weighs 140 pounds.

The takeoff is identical for all trucks. Mounting parts for individual truck makes are available. Davey points out that installation time for the new-model takeoff has been reduced 50 per cent, due to design simplification. A vacuum shift control is offered as optional equipment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 423.

Detailed Crane Catalog

An 18-page catalog on the TL crane series, with both crawler and rubber-tired mountings, has been prepared by The Thew Shovel Co., 28th St. and Fulton Road, Lorain, Ohio.

Step-by-step pictures show how a TL Series turntable is built by means of interchangeable packaged components. The photos are of the cutaway type showing the construction of engine, clutch shaft, hoist shaft, and related subassemblies. Then comes a discussion, with pictures, of the crawlers available with the TL Series and the tire-mounted rigs.

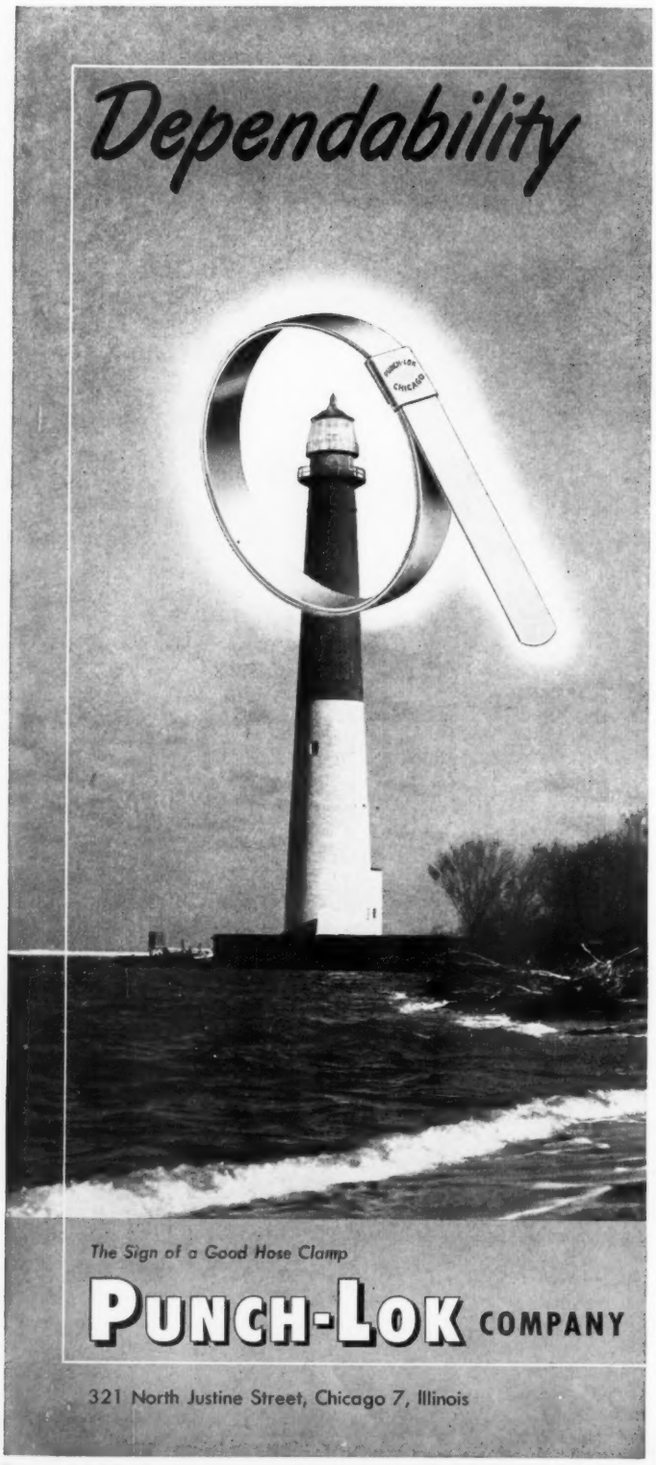
The 2-engine Moto-Cranes are available in 4 and 6-wheel models, with and without front-wheel drive, in standard-track and wide-track models. Four self-propelled mountings and four dual-control mountings are also available. The dual control combines the features of the Moto-Crane and the self-propelled TL crane. With dual control it is possible to use the Moto-Crane engine and automotive propelling and steering mechanism to move from job to job at speeds up to 33 mph, the company says. Once the job is reached, a 5-minute operation converts the machine into a self-propelled unit, as designed for localized work on the job.

The new catalog also contains complete data and photos of the attachments for the TL Series: shovel boom, crane boom, clamshell, dragline, and backhoe.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 426.

Joins Soil-Testing Company

Harold L. Woodsum has joined the engineering staff of Soil Testing Services, Inc., Chicago, Ill. Mr. Woodsum was formerly associated with the Civil Engineering Department of Purdue University, Lafayette, Ind.



NOW! ONE SAW makes every cut in 2 in. dressed lumber

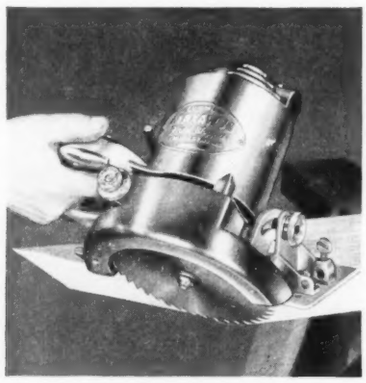
You no longer need both a light saw and a big saw to make every cut in 2-in. dressed lumber! Now, *one saw* does it! The MAXAW 70 with **magic pivot** combines light weight with full cut *with blade to spare.*

magic pivot does it! This exclusive, simple engineering principle, long overlooked, puts the pivot point closer to the saw shaft, steps up performance with:

- —deeper cuts at 45° than any other saw, on any dollar for dollar, pound for pound comparison!
- —blades last twice as long; hard biting *stub-radius* blades take 3 to 4 more sharpenings, still hold full cutting depth at 45°.
- —more power at the cutting edge—faster work.
- —total weight of only 10 lbs.,—5 to 8 lbs. less than equal quality heavy duty ball bearing saws.

Ask for the **magic pivot** MAXAW 70 today—it's your king size saw value. Now at all MAXAW dealers.

NEW Fred Wappat magic pivot



MAXAW 70, heavy duty, all ball bearing industrial quality —Cuts 1-7/8 in. at 45° —2-1/16 in. straight

Makes all 45° Cuts

for all construction in 2 in. dressed lumber

MAXAW® 70

$69.50

GET THIS FREE PLYWOOD AND LUMBER FOOTAGE CALCULATOR
Here is something every man who cuts lumber needs to help him do faster, more accurate work. Sent free on request.

OTHER magic pivot MAXAWS for Heavier Duty Work

MAXAW 80 2-3/16 in. at 45° 2-5/8 in. straight

MAXAW 90 2-3/16 in. at 45° 2-5/8 in. straight

MAXAW 110 2-13/16 in. at 45° 3-7/16 in. straight

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Over 60 Years of Precision Manufacturing for Customers Who Must Be Satisfied

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DIVISION OF
Cummins-Chicago Corp.
4740 N. Ravenswood Ave. • Chicago 40, Ill.

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☆ Let Your Dollars Fight Polio ☆

The Jaeger 365 compressor, powered by a Cummins diesel, delivers air to sand-blast some steel frames. It is mounted on structurally welded main frames.

Compressor Delivers 365 Feet Per Minute

A portable air compressor rated at 365 cfm at 100-psi pressure has been announced by The Jaeger Machine Co., 701 Dublin Ave., Columbus 16, Ohio. The Model 365 is powered by a 165-hp Model HRBI-600 Cummins diesel engine, a 6-cylinder power plant with a displacement of 747 cubic inches, a compression ratio of 15.5 to 1, and a maximum rated rpm of 1,800. Both compressor and diesel engine are mounted on structurally welded main frames, with pneumatic tires, steel wheels, or skid mounting. The heavy-duty carrier has an auto-steer front axle, and can be hauled safely at 35 mph over rough roads, the company says.

The compressor has enough air power to operate a heavy-duty wagon drill plus an auxiliary rock drill. It may also be used with various other pneumatic-tool combinations: two medium wagon drills, or three heavy-duty rock drills, or 10 light-duty concrete breakers, etc. Other features are its large-size valves for free air flow, positive pressure lubrication with filtered oil to protect the unit under all operating conditions, over-size clutch and bearings, and extra-large toolbox.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 414.

HRB on Night Visibility

Four papers presented at the Thirtieth Annual Meeting of the Highway Research Board make up the Board's Bulletin No. 43—"Studies in Night Visibility".

"Factors Affecting the Perception of Relative Motion and Distance Between Vehicles at Night", by Donald R. Hoppe and A. R. Lauer, both of the Driving Laboratory of the Industrial Science Research Institute of Iowa State College, deals with driver reaction to various conditions of visibility, particularly in the case of a vehicle being overtaken at night. Tests were made with varying reflective panels on the rear end of the leading vehicle and different lights on both an overtaking and an opposing vehicle. The results of the tests showed the beneficial effect of a highly reflective tailgate.

Another paper in the bulletin—"Field and Laboratory Evaluation of Roadside Sign Surfacing Materials", by James H. Havens and Allie C. Peed, of the Kentucky Department of Highways—discusses the physical and optical characteristics of sign materials, with test results. It reports a marked increase in viewing distances for reflectance values up to about 0.20.

"A Study of the Relationship Between Photopic and Scotopic Visual Acuity", by J. E. Uhlaner and Irving A. Woods, of the Personnel Research Section, AGO Department of the Army, is a report of vision tests, by day and night, administered to 202 soldiers. The authors found a positive correlation between the two types of visual acuity.

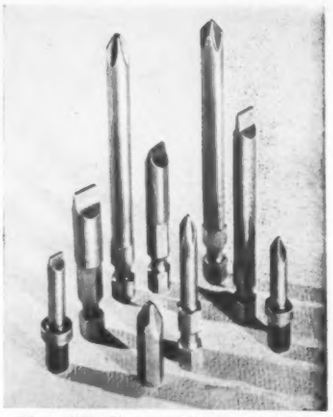
Finally, a "Filter Study of the Effect of Certain Transmission Filters on Visual Acuity With and Without Glare", by A. R. Lauer, reports on the testing of a set of 20 filters for the effect on visual acuity. In all cases the introduction of a filter caused a decrease in visual acuity.

Diagrams, photographs, and tables accompany all the papers, together with bibliographical references. HRB Bulletin No. 43 may be obtained, at a cost of 90 cents, by writing to the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

Screw-Driver Bits

Power-screw-driver bits — ¼-inch hex drive and threaded shank bits—for slotted screws, Phillips screws, and Frearson (Reed & Prince) screws are available from Ludwig Hommel & Co., 72 First Ave., Pittsburgh 22, Pa. They are made of alloy steel, are precision machined, heat-treated, and carefully finished.

Further information on these bits may be secured from the company. Or use the Request Card at page 16. Circle No. 488.



"For difficult screw-driving jobs"—these ¼-inch hexagon-drive and threaded-drive bits.

Tiger Brand Wire Rope

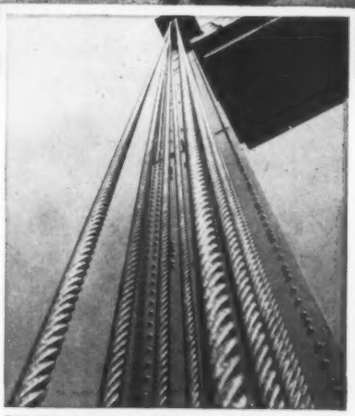
lifts largest single-plate girder span ever erected

WARD'S ISLAND LIFT BRIDGE for pedestrians connects Manhattan and Ward's Island.

● The Ward's Island Lift Bridge connecting Manhattan and Ward's Island is reputed to be the largest single-plate girder span ever erected. This is a pedestrian bridge spanning part of the East River. The center span is 312 feet 2¼ inches long and is designed for an 80-foot lift.

The main span weighs 375 tons and is hoisted by 32 U·S·S American Tiger Brand Wire Ropes 1⅝ inches in diameter. The ropes are prestressed 6 x 19 Monitor Steel with Fibre Core. This construction has the requisite strength combined with the proper flexibility to give long service.

On big jobs requiring utmost dependability, engineers choose a wire rope that has proved itself in service. That's why they select U·S·S American Tiger Brand so often. But whether your job is big or small, you can find a Tiger Brand Wire Rope designed to fit your needs. Let our wire rope specialists help you choose the Right Rope for your particular jobs.



CHAMPION WEIGHT LIFTERS Each of the 32 Tiger Brand Wire Ropes supporting the center span lifts 11.7 tons with plenty of excess strength for safety.

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American Steel & Wire Division
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Please send me your Recommendation Booklet, "The Right Rope for the Job."

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Company.....

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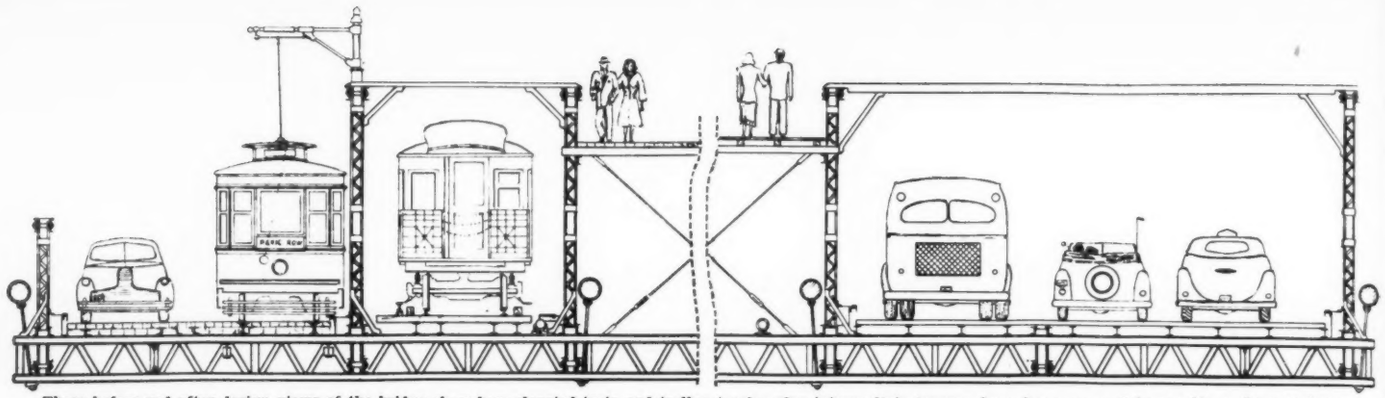
USS

UNITED STATES STEEL

Historic Brooklyn Bridge



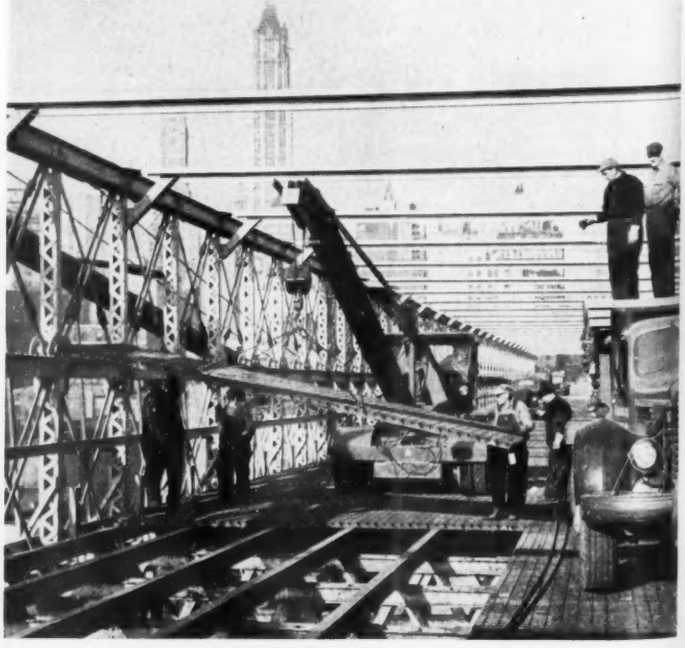
These before-and-after design views of the bridge show how elevated-train and trolley tracks, plus intermediate trusses, have been removed to provide a clear roadway

1. First stage in the renovation was preparing the shallow outer trusses for the addition of an 8-foot 3-inch section: top chord of the intermediate truss.

3. Once the outer truss was built up to its full 17 feet and transversely braced to the center truss, contractor Klevens used a Tracto-Shovel to strip the old wood-block roadway.

2. To remove this intermediate-truss top chord and set it on the outside truss, subcontractor Terry Steel Constructors, Inc., used a Krane Kar.

4. The Krane Kar, working under overhead struts, then set Carnegie 3-inch I-Beam-Lok flooring. Note the Warren truss-type floor beams of the original bridge construction.



Gets an Up-to-Date Roadway

By MICHAEL A. SPRONCK,
Associate Editor

Trusses Rebuilt, Flooring and Tracks Torn Up, to Provide New 6-Lane Roadway Over the East River

• THE dream of spanning the busy East River between New York and Brooklyn became a reality 68 years ago with the completion of the Brooklyn Bridge—a tremendous accomplishment in the design and construction of long-span suspension bridges. Today the historic bridge is being modernized. As intermediate trusses are removed and outside trusses built up—in symmetrical fashion to keep loads on the cables and towers balanced—the wood-block flooring and trolley tracks are being replaced by two modern 30-foot roadways of concrete-filled steel decking.

Were John and Washington Roebling alive today, they would marvel at the city that has grown around the bridge they built. The growth is due in good part to the bridge, to the easy travel it fostered between New York and Brooklyn. But as the horse-drawn vehicle and trolley gave way to the motor car, the bridge became less useful to the traveler. Its trolley and elevated-subway tracks became obsolete and its narrow wood-paved roadways proved insufficient for fast, safe, modern travel.

Accordingly, the New York City Department of Public Works decided to modernize the bridge. It selected David B. Steinman, world-renowned bridge designer and biographer of the Brooklyn Bridge and its builders, to prepare the plans.

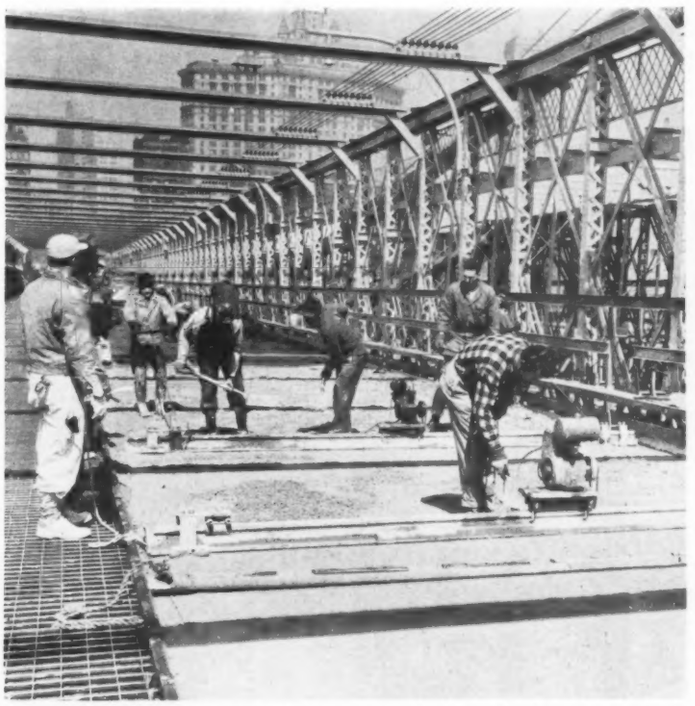
Old and New Designs

The Brooklyn Bridge lies on an east-west axis. Its 1,595-foot center span and two 930-foot side spans are supported by four 15¾-inch-diameter cables containing 5,296 galvanized wires, each of 1.65-inch diameter. The entire structure is stiffened by diagonal stays supported from the tops of the towers and, as originally built, by six longitudinal trusses.

The four original interior trusses were 17 feet deep; the two outer trusses, 8 feet 9 inches deep. The interior trusses, which served to distribute the live load and impact of train operation, also served to separate the various types of traffic: pedestrian between the two center trusses, subway trains between these and the intermediate trusses, and vehicular traffic between the intermediate and the outer trusses. The promenade was 14 feet 5 inches wide and elevated to provide a pleasant walk for city dwellers on sunny days. The elevated trains each side of this had 12 feet 8 inches of clearance between trusses. The roadways at the outsides of the bridge were 16 feet 7½ inches wide. These, however, had trolley tracks set into the wood-block decking and therefore really permitted auto traffic in only one lane.

(Concluded on next page)

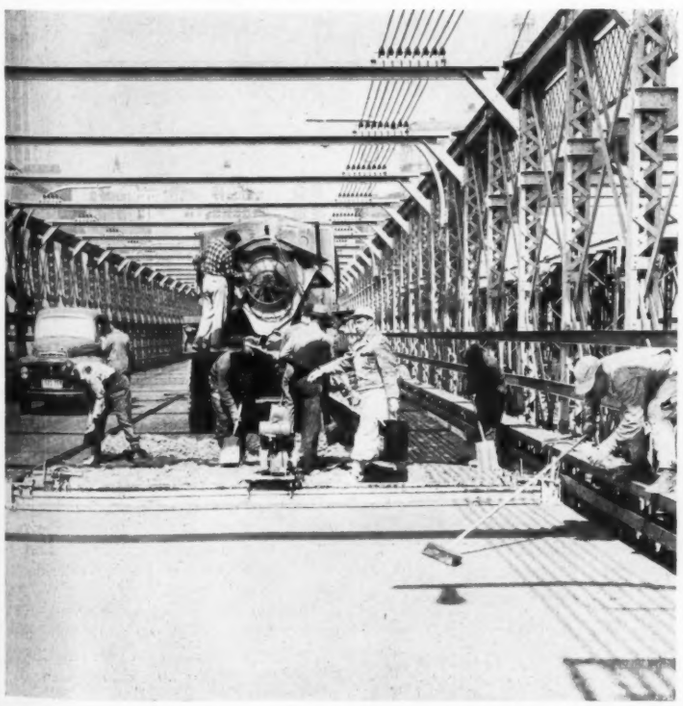
5. Over 200,000 square feet of flooring was set in place and welded with 3/16-inch Fleetweld electrodes, using 20 Lincoln portable 300-amp welders.



7. Master vibrating screeds, riding on the forms, worked in tandem to level the concrete. They were followed by a burlap hand drag.

(Klevens Corp. Photos)

6. Transit-mixed concrete to fill the grating was brought to the job in Jaeger 6-yard agitator bodies mounted on Mack six-wheelers.



8. John and Washington Roebling would hardly recognize their modernized bridge today, with its clear 30-foot roadways on each side of the promenade.

Old Brooklyn Bridge Gets Modern Roadway

(Continued from preceding page)

The new design eliminates the elevated and trolley tracks and the intermediate trusses, providing a clear 30 feet on each side of the promenade for auto travel. The intermediate trusses were cut down to roadway level, leaving the bottom chord in place as a distribution member to transfer concentrated loads to several floor beams. The top chord of the intermediate truss was used to build up the outer truss, from 8 feet 9 inches to a full 17 feet. Outer and center trusses were then braced by struts between the top chords.

The Warren truss-type floor beams, 2 feet 8 inches deep and 7 feet 6 inches on centers, remain in place. The new design, however, provides an entirely new floor surface: 8 inch 23-pound I-beam stringers, 3 feet to 3 feet 6 inches on centers, supporting a 3-inch concrete-filled steel grating. This will meet the standards for an H-15 AASHO loading. The promenade will be refloored with 1 x 3 treated-timber planking laid over 4 x 5-inch stringers.

Reconstruction

The general contract was awarded January, 1950, to Klevens Corp., of Brooklyn, at a low bid of $3,317,536. First consideration in planning the work was to maintain complete balance of loads on the bridge. Though the total weight of the reconstructed bridge is about the same as before, it was vital that cable tensions on the land and river spans be uniform to prevent undue stressing of the towers and the stiffening trusses of the bridge. For this reason the contractor had to work at four points simultaneously, the progress of each operation maintaining a position symmetrical with the towers.

Fortunately the four main cables are positioned so that the north and south sides of the bridge are relatively independent of one another. This meant that the contractor could reconstruct one roadway at a time. If such had not been the case, he would have had to work 8 points simultaneously and keep the bridge closed to traffic until the job was completed.

Work started March, 1950, with the removal of the intermediate truss and build-up of the outer truss on the south side of the bridge. This phase of the work was subcontracted to Terry Steel Contractors, Inc. The steel sections were cut and taken down by Krane Kars, but some problems arose when new steel had to be riveted to the old.

As noted already, the outer trusses were built up using the top chord of the intermediate trusses. New steel sections were used to connect the salvaged chord and what was formerly the top chord of the outer truss. Specifications called for riveted connections, as used in the original construction. However, the bridge was one of the first to be constructed of an alloy steel, which was not up to present standards of quality and uniformity. And it was discovered, upon removal of the roadway decking, that this old steel did not react well to drilling. Accordingly, it was decided to substitute welding for riveted connections.

After the new truss system of the south roadway was in place, the contractor started removal of one half of the roadway flooring. Since one side of the roadway was to be kept open to construction traffic at all times, access had to be maintained on the working side. Because of the limitation of access and the problem of maintaining uniform loads on the cables, the steel crews worked from the outside wood-block roadway to rip out the old subway tracks and set new stringers and grating. This work was done with Krane Kars since the overhead struts prohibited the use of anything with a long boom.

A Tracto-Shovel mounted on an Allis-Chalmers HD-5G tractor stripped the wood-block surface. Then Krane Kars, now working from the lane of grating previously installed, took out the steel troughs supporting the blocks and the trolley rails. After this, stringers and grating were placed in the outside lane.

Over 200,000 square feet of Carnegie 3-inch I-Beam-Lok flooring was installed on the job. Welding for this phase of the work was done by J. K. Welding Co., Brooklyn, using 3/16-inch Fleetweld electrodes. Power was supplied by 20 Lincoln portable gasoline-powered welding machines each with a capacity of 300 amperes. The grating was fitted on the underside with 20-gage steel arched pans to cut down the weight of the concrete filling.

Transit-mixed concrete was brought to the job in Jaeger 6-yard agitator bodies mounted on Mack six-wheelers. Leveling was done with two Master vibrating screeds riding on the forms. A Type I portland cement was supplied by North American Cement Co.

Personnel

The south roadway included in the contract was completed and opened to traffic by May, 1951. The north roadway, too, was completed except for concreting the steel grating, which will be done this spring. Another contract for the reconstruction of the Manhattan and Brooklyn approaches was awarded to the Klevens Corp. and is still under way; this portion of the project is scheduled for completion by the early part of 1953.

The projects are under the direction of Frederick H. Zurmuhlen, Commissioner of the New York City Department of Public Works, and J. Frank Johnson, Director of the Bridge Division. J. London is in charge of design for D. B. Steinman, Consulting Engineer. Theodore Mombelly is Resident Engineer on the job.

The contractor's forces, about 175 men, were directed by Arthur Klevens, Vice President; Robert Freeman, Chief Engineer; and Arthur Miller, General Superintendent.

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Driver Fatigue Can Be Fatal

One of the important causes of the nation's tragically high traffic-accident rate is often overlooked, said L. S. Harris, Executive Director of the American Association of Motor Vehicle Administrators, recently. The new national disease "tenigue" (a combination of driving tension and fatigue) deserves far more attention than it gets, and his remedy is a very simple one—more "coffee stops".

Studies of passenger-car and truck driving show that long hours at the wheel under current traffic conditions induce fatigue that slows down physical reaction and mental powers of observation; hand and eye coordination is impaired, and drivers tend to become a danger to others on the highway as well as susceptible to accidents themselves. Truck drivers in particular suffer from long hours on the road, and Mr. Harris was strongly of the opinion that a reasonable limitation of hours of service is called for, as well as an increase in the frequency of stops.

Speeding, driving on the wrong side of the road, and other such improper driving practices account for nearly half the toll of highway deaths and injuries. That physical letdowns play an important part in such behavior, said Mr. Harris, is easier to believe than that bad driving habits arise from sheer negligence and a callous indifference to the lives and rights of others. "We have not yet placed enough emphasis", he concluded, "on the inability of human energies to cope with the strain of everyday life plus the tension of handling a high-powered vehicle in our maelstrom of traffic".

Caterpillar Subsidiary

Trackson Co., Milwaukee, Wis., manufacturer of Traxcavators, TracLoaders, pipe layers, swing cranes, earth augers, tree dozers, brush rakes, Anglegraders, and Anglefillers, is now a wholly owned subsidiary of Caterpillar Tractor Co., Peoria, Ill. Louis B. Neumiller, President of Caterpillar, is Chairman of a reconstituted Trackson board of directors which includes Walter H. Stiemke, Trackson President, and William Blackie, Ralph M. Monk, and J. R. Munro, of Caterpillar. Mr. Stiemke and L. E. Dauer, Trackson Vice President, continue in their former administrative capacities. George L. Scripps, formerly Assistant Treasurer of Caterpillar, becomes Secretary and Treasurer of Trackson, succeeding Henry Gotfredson, who has retired.

Data on Fans and Blowers

A wide range of fans and blowers is listed in a new catalog issued by Standard Electric Mfg. Co., West Berlin, N. J. It illustrates and gives specifications for fans which can be used for removing dust, welding fumes, and gases.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 458.

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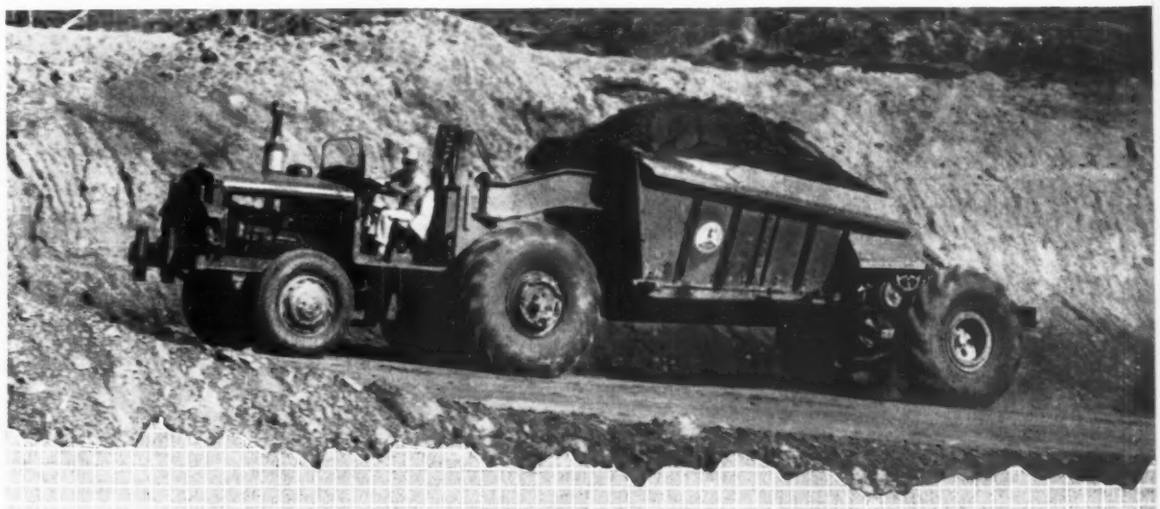

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Distributor Doings

What Did They Need in 1801?

One hundred and fifty years is quite a stretch, but L. L. Ensworth & Son, Inc., of Hartford, Conn., makes light of it. Founded in 1801, the firm has continued to supply contractors in its area from that day to this, though the equipment furnished has varied somewhat with the years.

On the occasion of its 150th birthday on October 1, 1951, Ensworth turned back the pages of its account books and told us something of the needs of contractors in the old days. In 1801, nails and the materials for making them, steel for hand-made hinges, and other building and wagon fittings, were much in demand. Pickaxes and shovels, too, were always a big item in the firm's contracting department, and carts and wheelbarrows, which now come with pneumatic tires, were furnished at that time with steel-shod wheels and wood bottoms and sides.

Included in the equipment the firm handles today are Black & Decker saws and electric hammers; Delta saws; Jackson wheelbarrows; Ames shovels; Porter cable sanders; Remington rivet guns; Plymouth rope; American Chain Co. chain and cable; Oster pipe machines and tools; and Blackhawk Porto-Powers. Here's to the next 150 years, Ensworth!

Booklet as Guide for Customers

A handy little booklet for its customers was a New Year idea thought up by Rish Equipment Co., Bluefield, W. Va. The booklet contains a short history of the Rish company, from its inception in 1934 to its present six-office organization. Headquarters are in Bluefield, and branches are in other West Virginia and Virginia cities, as well as in Cincinnati, Ohio. Included in the booklet are a description of the organization's service facilities; a list of the Rish offices with their personnel; a list of the manufacturers whose equipment Rish sells, and the organizations which buy it; and a summary of some projects undertaken with Rish equipment, together with pictures of some of it in action.

North Carolina Dealer for Heil

J. B. Hunt & Sons, Inc., Raleigh, N. C., is a recently appointed distributor for Heiliner scrapers and wagons made by The Heil Co., Milwaukee, Wis. The distributor firm was founded in 1933 by J. B. Hunt, Sr., and his son. It represents manufacturers of graders, shovels, compressors, concrete pipe, etc., and maintains separate facilities for offices, service and parts, and warehousing.

He Was Euclid's First Salesman

R. A. Trippeer, President of the three Trippeer organizations which distribute Euclid road machinery in Memphis, Tenn., St. Louis, Mo., and Louisville, Ky., has an interesting story to tell, and he tells it in a 12 x 15-inch illustrated book called "Free Enterprise".

Dick Trippeer's first contact with Euclid came about in 1928 when he

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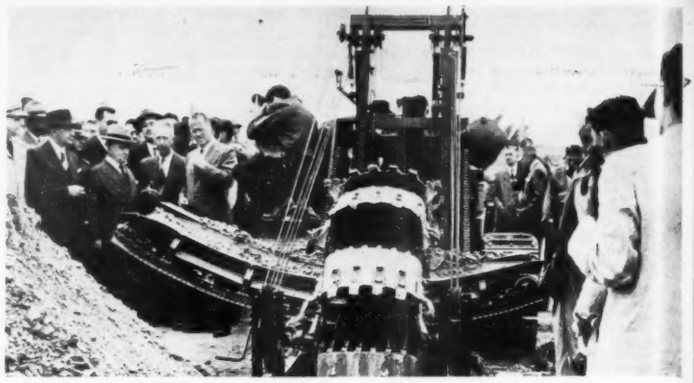
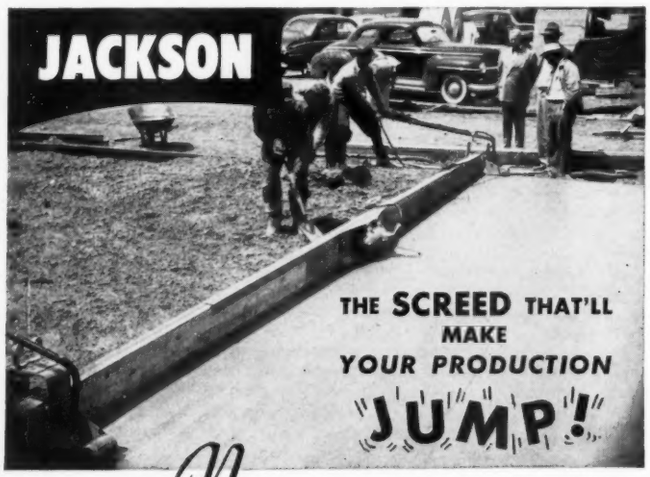


The start of construction of a branch of the Brazilian Central Railroad is marked by ceremonies featuring American equipment. Here a Cleveland trencher is the center of interest. President Vargas, surrounded by Government and railroad officials, receives an explanation of mechanical details. Amrocta Co., New York City, was export agent.



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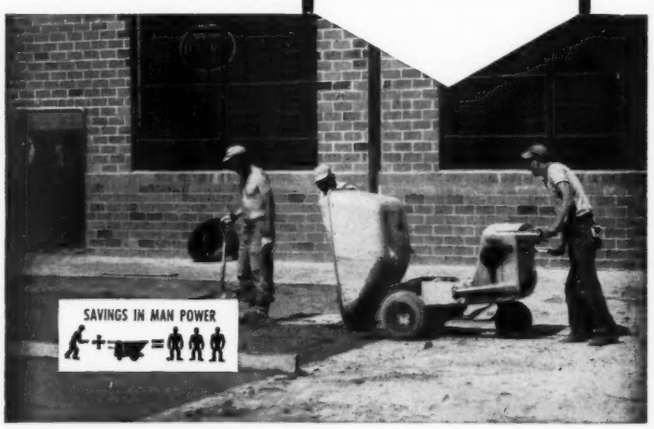

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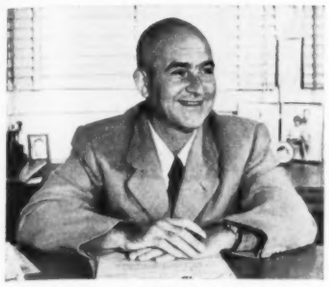
THE Bell PRIME-MOVER

Distributor Doings

(Continued from preceding page)



R. A. Trippeer, President of three companies which distribute Euclid equipment, tells a true success story in a booklet titled "Free Enterprise".

was paying a visit to his family in Peru, Ind., soon after finishing college His father, a road contractor, asked him to run an errand which involved driving over to the Euclid plant. Young Trippeer was offered a job at the plant, and not long afterwards sold his first scraper, thus earning the distinction of being Euclid's first salesman.

One thing led to another: he began to sell Euclids all over the south, establishing dealerships from El Paso, Texas, to Greensboro, N. C., and, in 1933, bringing about a change in the company's system of operation. In 1934 Mr. Trippeer opened his first small Memphis warehouse on N. Main St., and soon moved to larger quarters. In 1939 he set up his present headquarters (Euclid-Memphis Sales, Inc., 185 E. Butler Ave.), tripling available floor space. In 1945, Euclid Sales & Service, Inc., 5231 Manchester Ave., St. Louis, was started, with E. E. Warner as Vice President and General Manager. The next expansion was in 1949, when Euclid-Kentucky, Inc., 3900 Crittenden Drive, Louisville, was opened, with J. C. Buhr as Vice President and General Manager.

"Free Enterprise" does not stop with the story of Mr. Trippeer himself—it introduces his right-hand men and gives an account in pictures and text of the work they and their staffs are doing. This story of "how one man tried to get ahead and did" is a send-off for a forthcoming announcement of a new Euclid-Memphis Sales warehouse and office building to be erected this year.

Mississippi Firm Handles 3 More

The Mississippi Road Supply Co., Jackson, Miss., now represents three more manufacturers: Standard Steel Works, North Kansas City, Miss., manufacturer of bituminous pressure distributors, maintenance distributors, street flushers, tar kettles, construction brooms, and gravel spreaders; American Coleman Co., Omaha, Nebr., maker of maintenance graders ranging from 31 to 50 hp; and Essick Mfg. Co., Los Angeles, Calif., which manufactures ball-bearing rollers in a weight range of 3 to 5 tons.

Northwestern Equipment Mgr.

N. O. Jones is the new General Manager of Northwestern Equipment, Inc., 2800 Front St., Fargo, N. Dak. He succeeds Stanley F. Laskey, President of the firm, who is named Chairman of the Board of Directors. Mr. Jones, who joined Northwestern at the beginning of 1951, had been North Dakota Highway Commissioner since 1945.

Beets Is Penn Drake Dealer

Abel J. Beets, 712 N. Foster Ave., Lansing, Mich., has been appointed distributor for Penn Drake snowplow wax. This product, made by Pennsylvania Refining Co., Cleveland, Ohio, is applied by brush or spray to the working surfaces of snow-clearing equipment to guard against snow sticking and "pile-up".

Mr. Beets will supply the wax throughout Michigan. He has served in construction and road building for over 25 years, and already distributes Beets-All heavy-duty and specialized lubricants and Cyclone filter elements and air cleaners. His associate, Tom Gormely, Newberry, Mich., serves the Upper Peninsula.

Giant-Truck Service School Completes 5,000-Mile Journey

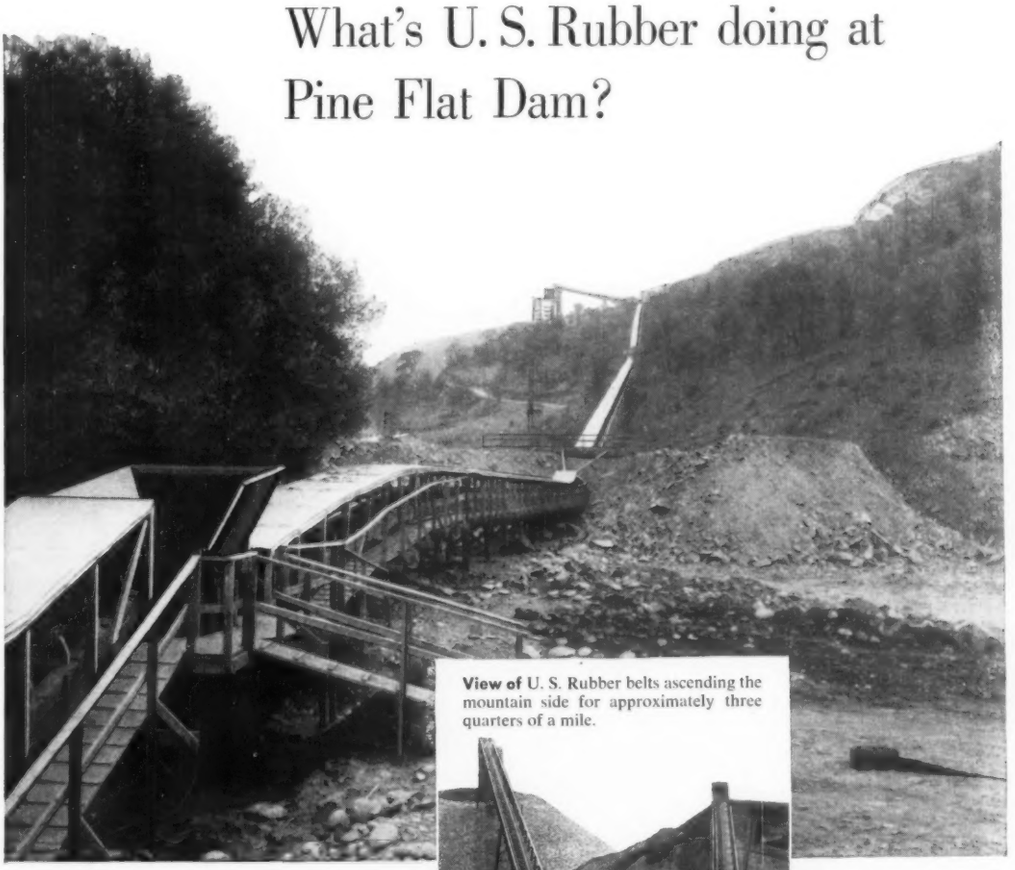
Distributors of LeTourneau equipment throughout western Canada and northwestern United States had an opportunity recently of attending a four-day-long service school. This latest training swing arranged by R. G. LeTourneau, Inc., Peoria, Ill., was made possible by the use of a tractor truck with a 33-foot van-type drop-frame trailer. The truck carries equipment cutaways, an animated electrical display board, visual aids, director-type chairs, and the disassembled 32-foot-square portable classroom. The display board is used to teach circuits and other aspects of the wiring system used on electric-control LeTourneau equipment.

This is the portable classroom LeTourneau sent around in a giant truck to distributors located in Canada and the northwestern United States, bringing them the latest word on maintenance procedures.

The training school visited the following distributors' offices: Miller, Bradford & Risberg, Inc., Eau Claire, Wis.; Prairie Equipment & Radiators, Ltd., Winnipeg, Manitoba, Canada; Costello Equipment Co., Ltd., Calgary, Alberta, Canada; Montana Powder & Equipment Co., Helena, Mont.; Modern Machinery Co., Inc., Spokane, Wash.; Vancouver Equipment Corp., Ltd., Vancouver, B. C., Canada; Loggers & Contractors Machinery Co., Portland.

(Continued on next page)

What's U. S. Rubber doing at Pine Flat Dam?



View of U. S. Rubber belts ascending the mountain side for approximately three quarters of a mile.

Stockpiling coarse and fine material taken from the gravel pit.

At this great California installation, the finished aggregates and sand are carried by "U.S." conveyor belts from storage all the way to the batching plant high up on the site. The belting is 36" wide, climbs six flights for a total distance of 3700 feet. This 100% "U.S." belt installation is another example of 3-Way Engineering —"U.S." engineers worked with the conveyor equipment manufacturer and the contractor to produce this economical and efficient haulage system.

United States Rubber Company engineers have designed and built conveyor belts for a variety of installations, large and small. Let them advise you on any materials handling problems. Write to address below.

PRODUCT OF U.S.RUBBER SERVING THROUGH SCIENCE

Here conveyors are stockpiling the finished washed-and-screened gravel.

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Distributor Doings

(Continued from preceding page)

Oreg.; and Bay Cities Equipment, Inc., Oakland, Calif.

Each of the four-day schools was held in the portable classroom set up inside the distributor's building, and brought the latest information on LeTourneau equipment maintenance procedures to the distributor's field staff. The schools were conducted by four LeTourneau men skilled in service practices.

Heck Equipment Changes Status

Virgil A. Heck is now President of Virgil Heck Equipment Co., Inc., 928 E. Mason Ave., Louisville, Ky., and his son, V. James Heck, is Vice President and Treasurer. These elections took place in December, 1951, and marked the incorporation of the company, which had been operated as a proprietorship since its organization in 1947. Actual ownership and policy remain unchanged.

Virgil Heck Equipment distributes a variety of contractors' equipment and supplies. Recent additions include Bil-Jax scaffolding, Termite concrete drills, Muller mortar and concrete mixers, and Hi-Way material spreaders.

To Work With Link-Belt Dealers

William J. Brinkworth has taken over the post of Representative, Distributor Sales, of the Southwestern Division of Link-Belt Co., Chicago, Ill. The headquarters of the division are at the company's plant in Houston, Texas. Mr. Brinkworth joined Link-Belt in 1929; he has filled a variety of posts with the company and has been in the Houston office since 1946. In his new capacity he will supervise sales through all the company's distributors in the Southwestern Division.

Graze-Dempsey Change

Word reaches us from Graze-Dempsey, Inc., Jacksonville, Fla., that Don Graze is no longer connected with the firm. His interest has been purchased by W. E. Dempsey. Graze-Dempsey continues to act as distributor for Barber-Greene asphalt plants and equipment, conveyor systems, and ditching machines; T. L. Smith transit truck mixers; Erie Steel Construction bins and batching equipment; Bay City shovels and draglines; Smith Engineering Works crushers, sand classifiers, screens, and dewatering cones; Marlow pumps; Winch-Lift trailers; Pitman Hydra-Lift truck cranes; Union Wire Rope Corp.; D. A. Lubricant Co.; and Clyde Iron Works.

Ken Hegner heads the Jacksonville warehouse, which provides complete parts and service facilities.

Brogdon Is Benson Tractor V. P.

At the annual Christmas Banquet of Benson Tractor Co., 6414 Harrisburg Blvd., Houston, Texas, the President announced the promotion of Orville R. Brogdon to a vice president and director. Mr. Brogdon has been with the firm for seven years and was Sales Manager before his new appointment, so his official position now is that of Vice President and Sales Manager.

Benson Tractor Co. handles the distribution of Allis-Chalmers tractors, construction machinery, and allied equipment in 24 counties within a radius of 100 miles around Houston. It also distributes machinery and equipment for Tractomotive Corp., Baker Mfg. Co., Gar Wood Industries, Inc., and Ottawa Steel Products, Inc.

Orville R. Brogdon is now a Vice President and Sales Manager of Benson Tractor Co., Houston, Texas.

Three New Distributors for Waco

Dealer firms in Colorado, Washington, and Utah have joined the distributors now handling Waco sectional steel scaffolding, manufactured by Wilson-Albrecht Co., Inc., Minneapolis, Minn.

The three new dealers are: Professional Paints, Inc., Denver, Colo. (for the territory of Colorado, four southern Wyoming counties, and western Kansas); Construction Equipment Co., Spokane, Wash. (for eastern Washington, northern Idaho, and seven western Montana counties); and Oscar E. Chytraus Co., Salt Lake City, Utah (for Utah and the southern half of Idaho). All of these firms have established separate Waco divisions, headed as follows: Professional Paints, Inc.—Edward Mad-

(Continued on next page)

8 EAGLE UNITS Utilized at this Michigan "Push Button" Washing Plant

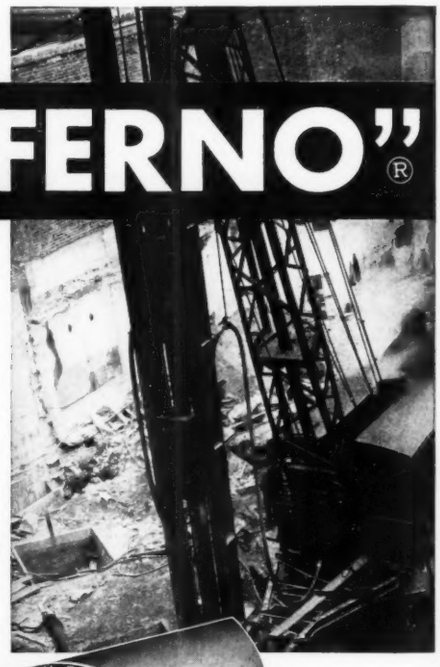
EAGLES are perched all over the modern, efficient washing plant of the Cheney Gravel Co., Holt, Mich. Their dredge is equipped with a light duty Eagle "Swintek" Dredging Ladder which increases ratio of solids intake and eliminates clogged lines. Material is pumped to a Field Dewatering Plant, shown top right, consisting of two Eagle Water Scalping Tanks and an Eagle Fine Material Washer. Dewatered material goes to an Austin-Western crushing plant and from there to an Eagle Washing and Classifying Plant equipped with a Water Scalping Tank, two fine Material Washers, one producing concrete sand and the other mortar sand, and an Eagle Coarse Material Washer for washing 10-A Aggregate (minus 1¼" to ⅝"). Much of the output goes to a subsidiary producing concrete products and to an associate road building firm. Entire plant is operated by push button control. Any motor can be stopped or started from control building.

The more Eagle equipment on the job the more you profit—send for the facts!

EAGLE IRON WORKS 159 Holcomb Ave. Des Moines, Iowa

"INFERNO"®

PILE DRIVER STEAM HOSE



Sizes: ½" to 2" in Maximum Lengths of 50'

"Standard of Quality"

"INFERNO" . . . the name to remember when you need hose for pile driving or any other heavy-duty steam service . . . the hose with a reputation for outstanding safety and durability under severest working conditions. A Goodall "Standard of Quality" product, recommended for pressures up to 200 lbs. and temperatures to 400°F.

The tube of "INFERNO" provides remarkable resistance to hardening and cracking under high temperatures. Tightly braided galvanized steel wires reinforce the rugged heat-resistant carcass. The tough red cover withstands hard abrasive wear and all kinds of weather. Despite its powerful construction, it has good, long-lasting flexibility.

PARTICIPATING IN THE MANAGEMENT AND FINANCING OF KENTUCKY SYNTHETIC RUBBER CORPORATION

Contact Our Nearest Branch for Further Details and Prices

GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

Est. 1870 Branches: Philadelphia · New York · Boston · Pittsburgh · Chicago · Detroit · St. Paul · Los Angeles San Francisco · Seattle · Portland · Salt Lake City · Denver · Houston · Distributors in Other Principal Cities

Distributor Doings

(Continued from preceding page)

igan, President, who will be assisted by Alvin D. Lichenstein and Martin Trotsky, with Bud Rifkin as Denver representative; Construction Equipment Co.—S. G. Peterson, Jr., President; Oscar E. Chytraus Co.—O. E. Chytraus.

Otterness for Albuquerque Firm

Contractors' Equipment & Supply Co., Albuquerque, N. Mex., has appointed R. A. "Bob" Otterness as Sales Manager. Mr. Otterness, who has 14 years' experience to his credit, will direct sales activities throughout the state of New Mexico, where Contractors' Equipment represents Baldwin-Lima-Hamilton Corp., Barber-Greene Co., Chain Belt Mfg. Co., Ingersoll-Rand Co., R. G. LeTourneau, Inc., Michigan Power Shovel Co., and other companies.

Southern Equipment Takes On I-H

Southern Equipment Sales Co., Sumter Highway, Columbia, S. C., is International Harvester's new distributor in the greater part of the state of South Carolina. This firm will handle the I-H Industrial line of tractors and power units in all counties except Abbeville, Greenwood, McCormick, Edgefield, Aiken, Barnwell, and Allendale.

Southern Equipment also distributes a complete line of construction industrial, logging, and material-handling equipment, and is equipped to render prompt mechanical and parts service to its customers.

Heads Distributor Sales

Jackson Kemper is now General Manager of Sales for the Distributor Products Division of The Watson-Stillman Co., Roselle, N. J., manufacturer of forged steel fittings, valves, pumps, jacks, and small hydraulic tools. Mr. Kemper joined Watson-Stillman in the spring of 1951 as Assistant to the late A. G. York, Vice President.

New Sales Manager for Reiner

Herman B. Robbins has recently become Sales Manager of the Generator Set Division of John Reiner & Co., Long Island City, N. Y. This division handles the distribution and sale of D. W. Onan generator sets as well as the Reiner line of diesel and gasoline generator sets, marine auxiliaries, and oilfield utility units.

Mr. Robbins, in addition to his regular duties, will be in charge of the company's export sales. This will necessitate extensive travel both in this country and abroad.

Missouri-Illinois Appoints

Arthur E. Squire is a new sales representative of Missouri-Illinois Tractor & Equipment Co., St. Louis, Mo. Mr. Squire, who has had about 20 years' experience in various aspects of the construction-equipment industry, takes over the Quincy, Ill., territory and will have his headquarters at the company's Quincy branch.

Works With Hough Dealers

Gene Thomas is District Representative of The Frank G. Hough Co., Libertyville, Ill., in the states of Washington, Oregon, Idaho, Montana, and Wyoming. He will work with distributors in this territory to promote the application of Hough Payloader tractor-shovels.

Southern Dealer for Clarkmoore

Municipal Sales Corp., 1715 Summit St., Richmond, Va., has taken on the sales distribution in eight southern states of the Clarkmoore asphalt heater-planer, manufactured by the Asphalt Maintenance Co., New York, N. Y. This piece of equipment is designed for maintenance work on blacktop roads, and Municipal Sales will handle it in the state of Virginia, North Carolina, South Carolina, Alabama, Arkansas, Mississippi, Florida, and Georgia.

Custom-Tailored Public Relations

A good idea comes to us from "Sales Booster", published by The Heil Co., Milwaukee, Wis. A Heil distributor, says the "Booster", has started a simple but effective scheme. He has his secretary go through the local papers and trade publications of his industry and pick out any items on promotions, elections, etc., affecting customers or possible customers of his. To each one he sends a note of congratulation. It never fails to please.

Shaw Handles Dreyer Vibrator

Shaw Sales & Service Co., with offices in Santa Barbara, Riverside, and

(Concluded on next page)

New! A HEAVIER MODEL
for Heavy and Extensive Digging
Added to the Shawnee Line

FEATURES:
160° operating arc.
14-ft. reach behind ditcher.
Bucket height, 10 ft. (dumping clearance with hydraulic bucket, 8 ft.)
9 ft. 6 in. digging depth (10 ft. with hydraulic bucket.)
Bucket widths: 12", 16", 18", 20".

SHAWNEE SCOUT DITCHER

The new Shawnee Scout Ditcher installs in ten-minutes on any Ferguson, Ford or Ford-Ferguson tractor.

With more powerful hydraulic cylinders with 2" and 3" bearings on each end, and more weight and power throughout, it answers the need of operators who do heavy digging.

For additional information about the new Scout, please write:

● SHAWNEE MANUFACTURING COMPANY
Products: Shawnee Ditcher • Scout Ditcher • Shawnee 'Dozer
1947 N. TOPEKA TOPEKA, KANSAS

PUT MORE ACTION IN COMPACTION with BUFFALO-SPRINGFIELD Gardner SEGMENTED ROLL

There's an Authorized Buffalo-Springfield Distributor Conveniently Located to Serve You

Official Tests Prove Buffalo-Springfield Gardner Roll Gives 3 to 7% Greater Compaction with Fewer Passes!

Actual tests, on projects under engineering supervision, reveal these important facts about this revolutionary new roll. When used in place of the smooth-faced guide roll on a conventional tandem, it increases compaction densities 3 to 7%, produces a better textured surface, less susceptible to traffic damage. Further—experience in compacting a variety of materials—including earth fills, stabilized bases and hot and cold mix bituminous—proves fewer passes are required to achieve specified densities.

Here's what T. F. Baun, president of Baun Construction Company, Fresno, California, says about performance of this great new roll on a recently completed California State Highway Project:

"The roll did an excellent job, both from an engineering and cost standpoint. We used it to compact the soil cement treated base, the plant mix base and the finish surface. In addition to saving the cost of other equipment, we got better compaction—in most cases with fewer passes—than if conventional type rollers had been used."

The Buffalo-Springfield Gardner roll is interchangeable with the smooth-faced guide roll on Buffalo-Springfield Tandem models KT-19, KT-20, KT-24B and KT-25B tandem rollers. It is also furnished for previously manufactured Buffalo-Springfield models KT-24 and VT-30.

Investigate the time-and-money saving, quality-improving advantages of the Gardner roll. See your Buffalo-Springfield distributor, or write direct.

BUFFALO SPRINGFIELD — THE STANDARD OF COMPARISON
SPRINGFIELD, OHIO

WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF ROAD ROLLERS

Distributor Doings

(Continued from preceding page)

San Diego, Calif., is now southern California distributor for Dreyer Vibrator Co., Los Angeles, manufacturer of flexible-shaft concrete vibrators. Shaw Sales & Service carries replacement parts as well as a complete line of Dreyer vibrators.

Air-Mack Represents Mixermobile

Air-Mack Equipment Co., 614 Elliott Ave., W., Seattle, Wash., has taken over, in the western Washington area, the representation of Mixermobile Manufacturers, maker of the Scoopmobile, Towermobile, Mixermobile, Duo-Way Scoop, etc. The firm carries a complete stock of parts and demonstration units relating to Mixermobile equipment. The Duo-Way Scoop, Air-Mack points out, adds a dozer blade to the rear of the Scoopmobile.

Among Air-Mack's other accounts are Blaw-Knox; Foote Co.; Gar Wood Industries; Porter cable saws; Gerlinger fork-lift trucks; and Construction Machinery Corp.

These Hough Model HE Payloader tractor shovels are all set for a highway maintenance job. Indiana Equipment Co. placed a fleet of 28 units with the Indiana State Department. The several monthly shipments were concluded last year.

Plane Turned Into Ambulance

With a specially arranged stretcher in his private Cessna airplane, Al Johnson of the Johnson Welding Co., Madison, Wis., flew a bedridden arthritis patient to Tucson, Ariz., recently. Mr. Johnson's firm is a Heil distributor. His patient on this mission was Mrs. Leo Merckel, and the flight was a gift to the Merckels, who are business friends of Mr. Johnson.

Plan to Aid Young Engineers

The first five years of professional development are critical ones for the young engineer who is either seeking an opening in the profession or still training for it. The Engineers' Council for Professional Development has initiated a program of advice and help to these young people, through the medium of a network of local committees made up of established practicing engineers. ECPD is a conference of engineering bodies, with head offices in New York City, having a membership of eight national engineering organizations. The aim of the conference is the enhancement of the professional engineer's status through the cooperative efforts of its member organizations.

In its Nineteenth Annual Report, ECPD summarizes the proposals of its Training Committee with regard to the 5-year program for young engineers. Under the chairmanship of A. C. Monteith, Vice President in Charge of Engineering and Research, Westinghouse Electric Corp., Pittsburgh, Pa., the committee presented a 6-point program to aid the young engineer in the right type of training, indoctrination, and self-analysis. Included in the program were examples of orientation and in-service training; continued college education; introduction to community service; indoctrination in characteristics, responsibilities, and ethics of the profession; recognition through registration; self-appraisal for the forming of personal plans; and selected reading for professional and personal growth.

The Training Committee report is only one of those contained in the ECPD Annual Report. All the other committees, as well as the constituent organizations, are represented by summaries of individual reports. Also listed are accredited undergraduate engineering curricula and technical-institute programs. To obtain a copy of the Annual Report, write to Engineers' Council for Professional Development, 29 W. 39th St., New York 18, N. Y. The price is 50 cents.

Additives in Engine Oils

What are additives? What are their functions in today's complex heavy-duty crankcase oils? These are two basic questions answered in the January, 1952, issue of *Lubrication*, a technical publication on the selection and use of lubricants, put out by The Texas Co., 135 E. 42nd St., New York 17, N. Y.

The article gives full data on the characteristics of additives, their physical and chemical properties, singly or in combination. It points out that additives solve the problem of the limitations of a single straight lube oil.

This literature may be obtained from the company, or use the Request Card at page 16. Circle No. 501.

Timken Appoints Managers

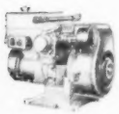
R. G. Wingerter is Assistant General Manager, and J. R. Splitstone District Manager, of the Automotive Sales Division of The Timken Roller Bearing Co., Canton, Ohio. Both men will continue to make their headquarters at the general office of the Division in Detroit, Mich. Mr. Wingerter has been serving in the Detroit office as a sales engineer for the past seven years; and Mr. Splitstone, in the same capacity, for eleven years.

Save Manpower-
Cut Costs!

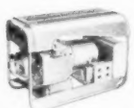
with ONAN Portable
ELECTRIC PLANTS

Use cost-cutting electrical tools on every job from start to finish, even where highline power is not available. Lightweight, heavy-duty Onan Electric Plants supply plug-in electricity *anywhere* for power saws, pipe-threaders, drills, planers, vibrators, repair-shop tools, other motor-driven equipment and lights. Lightweight, air-cooled models: 400 to 5,000 watts. Water-cooled plants to 35,000 watts.

A MODEL FOR EVERY CONSTRUCTION JOB



ONE-CYLINDER MODELS Lightweight, heavy-duty air-cooled. 400 to 1,000 watts A.C. 750 to 1,500 watts D.C.



TWO-CYLINDER MODELS—Horizontally-opposed air-cooled. 1,500 and 3,000 watts A.C.—2,000 and 5,000 watts D.C.

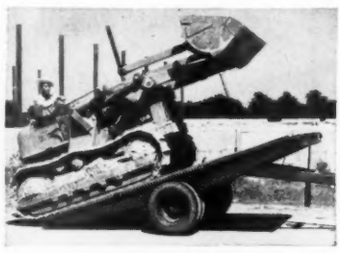
WATER-COOLED MODELS — 5,000 to 35,000 watts, A.C. Powered by heavy-duty industrial gasoline engines.

Write for Folder

Onan PRODUCTS

D. W. ONAN & SONS INC.

7472 UNIVERSITY AVE. • MINNEAPOLIS 14, MINN.



CUT JOB-TO-JOB TIME LOSS!

MILLER *Tilt-Top* gets slow machines there *faster*

MODEL "B" 10 TON $1175. The following equipment is optional and extra: hydraulic tilt control, two speed winch, electric brakes.

"More capacity per dollar"

Where large flat bed trailers are usually too cumbersome for lighter hauling . . . a MILLER Tilt-Top is always handy for moving slow machines from one operation to another. Self moving equipment practically loads itself onto tilted platform and can be towed to the next operation in jig time . . . cutting non-productive time for operator and equipment to a minimum. Standard platform is 14' x 8', optional 16' available.

MILLER Tilt-Top TRAILERS

MILLER RESEARCH ENGINEERS

Write for FREE literature
729 W. BURNHAM ST.

Dept. C-2
MILWAUKEE 4, WIS.

A state trooper patrolling the New Jersey Turnpike uses the newly installed RCA microwave system.

Microwave Control On N. J. Turnpike

The New Jersey Turnpike Administration is leaving nothing to chance in its determination to make the new road a superhighway in every respect. The latest news concerns a microwave system installed on the turnpike to channel traffic-control, accident-handling, and road-maintenance calls. Operating at a frequency of 960 megacycles, the microwave provides a voice channel for monitoring the entire system, another for dial-phone administrative calls, two voice channels for communication with state police cars and maintenance trucks fitted with two-way mobile radio equipment, and one party-line Teletype. At five of the system's seven microwave towers there are VHF base stations which maintain contact with police cars and maintenance trucks, furnishing two-way mobile-radio coverage for the length of the turnpike from Delaware River Bridge, Pennsville, N. J., to the New York State border.

The installation does away with the need for underground cables or overhead pole-and-wire lines, and assures continuous functioning in all kinds of weather. The Turnpike Administration at New Brunswick commands instantaneous communication with all state troopers, maintenance trucks, and toll gates along the road. Dial phones and Teletype link police divisions with one another and with state police headquarters at Trenton.

The credit for this modern highway-communication control system goes jointly to the Paul Godley Co., which formulated the broad engineering requirements, and the Engineering Products Department of the Radio Corp. of America, which designed the radio equipment and worked out details. The RCA Service Co. did the installation.

The Godley Co. is also responsible for developing the VHF directional antennas. These assure a strong signal along the highway with a minimum possibility of interference to and from adjacent communities, and enable mobile units to select between two base stations in areas where overlapping signals might confuse reception. A switching arrangement at the turnpike headquarters permits separation of the system into two, three, or four sections, thus increasing flexibility and message capacity. Tied end-to-end, the system forms one large party line. If serious traffic congestion develops in any one region, the New Brunswick headquarters can isolate that section of the communication system, leaving it free to handle its local affairs without tying up other calls. But headquarters can still monitor messages exchanged in that area and, by a throw of the switch, can bring it back into the over-all system when advisable.

The seven towers of the new system have been erected in or near Swedesboro, Moorestown, Bordentown, Trenton, New Brunswick, and Newark, with two near the last-named city. The base stations employ 60-watt RCA radio transmitter-receiver units, while at interchanges, maintenance buildings, and other points there are 15-watt fixed-station transmitters. More than 50 police and maintenance vehicles are equipped with 15-watt Carfone transceivers. The microwave relay equipment is RCA Type CW-5B 960-megacycle.

Nordberg Takes Over Al-Pac

Establishment of a new branch office in Seattle, Wash., began the year for Nordberg Mfg. Co., Milwaukee, Wis., manufacturer of engines, compressors, crushers, etc. In opening this office, Nordberg acquired the sales and service facilities of its former distributor, Al-Pac Engine & Equipment Co. Carl S. Harris, who used to be Manager of Al-Pac, is now Manager of the new branch office.

The Seattle office is located at 2520 Westlake Ave., N., and the territory it covers includes Alaska as well as the Pacific northwest.

At DIGGING and LOADING— It's a PIPPIN!

The PIPPIN EXCAVATOR — a combination digger and loader attachment for Ford and Ferguson tractors —

- Back hoes, front hoes, shovels and loads
- Converts from back to front hoe in five minutes
- Digs 7' deep. Back hoe buckets available from 15" wide to 37" wide.
- Bucket capacity 1/5-yd.
- Bucket elevates to 14' above grade
- Load swings laterally to 110 degrees

For greater work capacity and lower costs, get a PIPPIN!

WRITE FOR CIRCULAR

PIPPIN CONSTRUCTION EQUIPMENT CO., Inc., White River Junction, Vt.

What do his figures tell him about this rope ?

Since the day it was installed, he's kept a brief record of this wire rope's performance. The black book tells him the date it went to work, the type of work it's doing, and roughly just how much it does each day. When the rope is retired from service, he'll be able to say whether it's done a good job for him—given him his money's worth.

Smart man! For of course he isn't keeping tabs on just this one rope. He follows the system with all the major wire ropes he buys. And why? Because he learned years ago that you can't compare brands of rope by guessing—by vague, hit-or-miss estimates.

Bethlehem earnestly recommends that you, too, keep figures on rope performance. Nothing elaborate—something that costs you only a few minutes' time each day. You see, we're so confident of our own product, Bethlehem wire rope, that we'd like to have you check it yourself. Stack it against the competitive brands of your choice. Keep records on all of them!

When you've been doing it long enough to make a comparison, study those figures. They'll tell you that every dollar invested in Bethlehem rope is money well spent . . . that you can't buy finer rope anywhere.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

LET YOUR RECORDS TELL YOU!

Lime Rock Underlies Superhighway Strip

Compacted Course Is Laid on Stabilized Subgrade, Primed, Then Topped by Asphaltic-Concrete Binder and Surfacing

• ONE of the longest highway construction projects under contract in Florida last year was on U. S. 1 south of Jacksonville in Duval County, where the State Road Department added 12.15 miles of 2-lane roadway to form a 4-lane divided highway. The new half of the superhighway has a 24-foot blacktop pavement on a lime-rock base, laid on a stabilized subgrade. The Duval Engineering & Contracting Co. of Jacksonville, Fla., did the work under a $649,265.15 contract which was scheduled for completion last fall.

U. S. 1, south of Jacksonville, is one of the state's most heavily traveled routes, and the new divided highway from the city line south to Bayard will be a boon to traffic along the Florida east coast. With completion of the project, the original 24-foot blacktop will carry southbound traffic, while the new eastern strip will carry northbound traffic on its two lanes. The roadways are separated by a 40-foot depressed parkway section.

The work of widening to the east was partially completed in 1950 under a previous contract. Shifting of electric power lines from the newly acquired right-of-way delayed this preliminary work, which included the clearing of thick underbrush from the added strip. The Duval contract included regrading, stabilizing the subgrade and shoulders, and constructing an 8-inch compacted Ocala lime-rock base supporting a 1½-inch asphaltic-concrete binder and a 1-inch asphaltic-concrete surface course.

Grading Operations

In the Duval contract the excavation item totaled 310,000 cubic yards of which about one-third was on the roadway and the remainder was taken from borrow pits. The new roadway is shallow fill embankment for most of its length. In a few locations, however, muck and gumbo were removed to a 6 or 7-foot depth and replaced with suitable material. For the most part, the rest of the material is a mixture of sand-clay and hardpan both from the roadway and borrow-pit excavation.

The bulk of the borrow came from two large pits located only a few hundred feet off the eastern boundary of the right-of-way. The larger, 8 acres in area, was 4½ miles south of the northern end of the job, while the smaller pit, covering 4 acres, was 5 miles north of the south end of the contract. Dirt from the borrow pits was excavated by a P&H 1½-yard dragline and hauled away in 4 bottom-dump Euclids carrying up to 16 yards a load.

Because of the high water table in this area, the dragline opened up only 40-foot strips at a time so that the trucks and excavator had the maximum freedom of movement at the pits. The depth of cut went to 12 feet in places, and the big holes gradually filled up with ground water forming artificial lakes. These bodies of water were later stocked with fish by the State Conservation Department.

Dirt-moving on the roadway was handled by 6 LeTourneau 15-yard Carryall scrapers pulled by Caterpillar D8 tractors. In some areas of hardpan, the ground was first scarified with a LeTourneau 3-prong Rooter pulled by a D8 tractor.

Stabilized Subgrade

Subgrade for the roadway was stabilized to a bearing value of 50 pounds to the square inch over a width of 26 feet and to a depth of 12 inches. The same degree of stabilization was carried out over the 10-foot shoulders to a depth of 6 inches. Most of the available dirt compacted well enough by itself to attain this 50-pound stabilization, but in some areas oyster-shell dust was added to secure the required strength. The White Shell Co. of Jacksonville supplied the stabilizing dust, which was a waste product from a chicken-feed factory.

C. & E. M. Photo

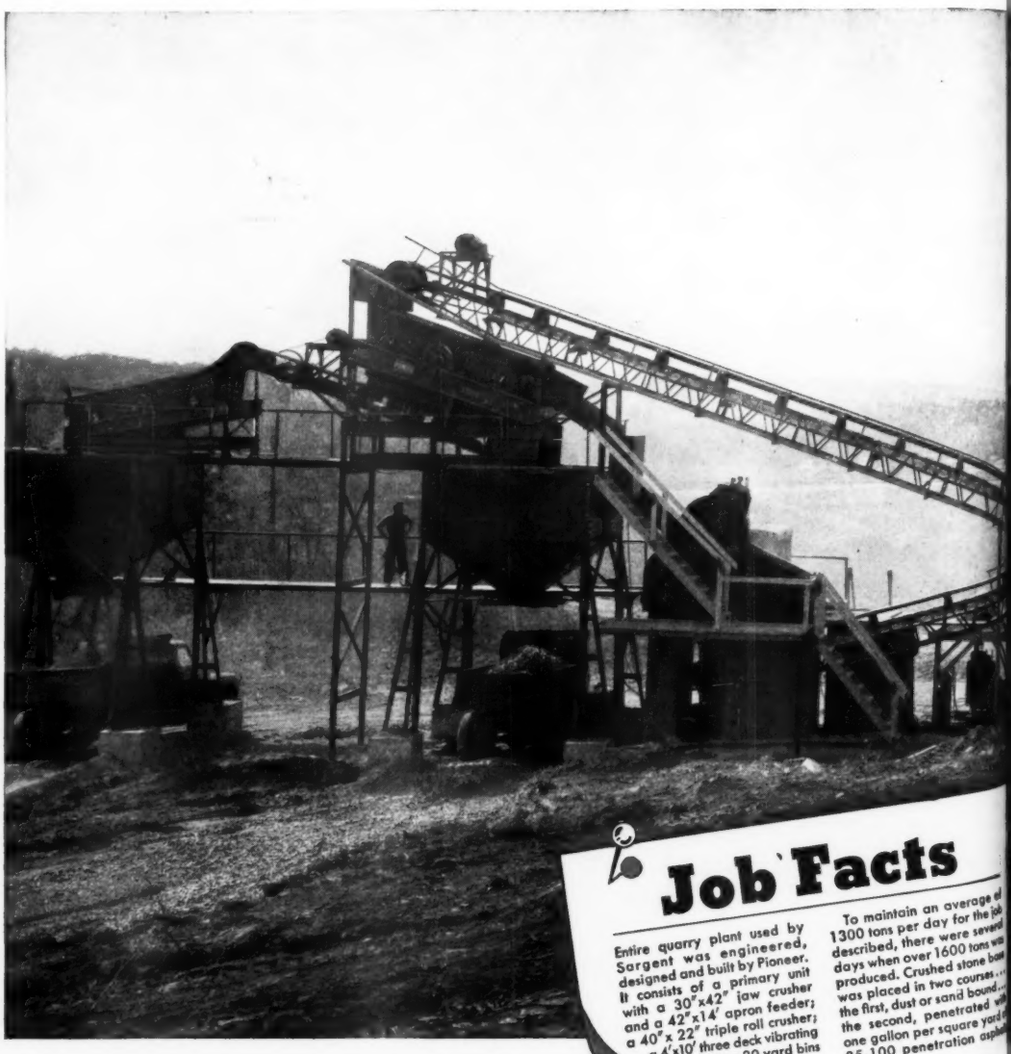
A Cedarapids compactor pulled by a D8 stabilizes subgrade on U. S. 1 in Florida.

Mixing of the dirt and shell dust was done by a Seaman Pulvi-Mixer pulled

(Continued on next page)

When you're racing time...

that Pioneer Edge



Job Facts

Entire quarry plant used by Sargent was engineered, designed and built by Pioneer. It consists of a primary unit with a 30"x42" jaw crusher and a 42"x14' apron feeder; a 40"x 22" triple roll crusher; a 4'x10' three deck vibrating screen; two 20 yard bins and 95' of conveyor.

To maintain an average of 1300 tons per day for the job described, there were several days when over 1600 tons was produced. Crushed stone base was placed in two courses... the first, dust or sand bound... the second, penetrated with one gallon per square yard of 85-100 penetration asphalt.

BUY BOTH! HIGHER OUTPUT LOWER UPKEEP

Pioneer Continuflo EQUIPMENT

C. & E. M. Photo

At a railroad siding a Bucyrus-Erie truck crane with a Blaw-Knox clamshell loads 8 tons of Ocala lime rock into an International L-180 truck with a Marion body.

C. & E. M. Photo

A D6 tractor-dozer spreads lime rock on Florida U. S. 1. Then rollers compact it.

by an International TD-14 tractor, making 8-foot-wide passes over the roadbed at a speed of about 3 mph. Each pass overlapped the other so as to insure complete mixing over the entire width. The stabilization was accomplished with a Cedarapids 25-ton compactor, equipped with four rubber tires inflated with 100 pounds of air, pulled by a D8 tractor. The subgrade was also compacted by a Tampo rubber-tire traffic roller pulled by a Case rubber-tired tractor.

Final shaping of the subgrade was done by a Caterpillar No. 12 motor grader that also cut the trench down the roadway for the lime-rock base course. Forms to contain the lime rock were laid 24 feet 4 inches apart, the width of the base course. They consisted of 2 x 10's in random pieces 12 to 14 feet long, supported by wooden stakes driven along the inside at each end of a form section. On the outside the forms were backed up with dirt from the shoulders.

Lime-Rock Base Course

Work on the lime-rock base course got under way in February and was completed by June. The Ocala lime rock came from Ocala, Fla., about 100 miles south of Jacksonville in the center of the peninsula, and was shipped in gondola cars to sidings of the Florida East Coast Railroad which parallels the highway. Two sidings, about 6 miles apart, were used so as to reduce the haul length. One siding was 3 miles south of the north end of the job, and the other 3 miles north of the south end of the project. This limited the maximum haul to 3 miles.

Before being shipped, the Ocala lime rock was crushed to such size that not less than 97 per cent passed a 3½-inch sieve, and was graded uniformly down to dust. All the fine material consisted entirely of dust of fracture. At the sidings a Bucyrus-Erie truck crane with a 30-foot boom and a Blaw-Knox 1-yard clamshell bucket unloaded the lime rock from the railroad cars into trucks which hauled the material to the road. At the start of this work the contractor used a fleet of 8 Mack trucks holding 10 tons of material, but these were later shifted to a Federal government project that the Duval Engineering & Contracting Co. was doing at Cocoa, Fla. International L-180 trucks equipped with Marion bodies were used for the rest of the hauling.

Laying of the base course started at the north end of the job and progressed toward the south, being put down in two 4-inch layers. The trucks always backed out over the rock that was previously placed, and dumped at the end of the preceding spread. In this way the rock was never dumped directly on the subgrade, nor was any hauling done over the prepared subgrade. A D6 tractor-dozer spread the lime rock, which was saturated with water when necessary as it was dumped and spread. Two 1,000-gallon tank trucks supplied the water from spray-bars at the rear. Rolling was done with a pair of Buffalo-Springfield 10-ton 3-wheel rollers.

Plant-Mix Surface

The second 4-inch course was laid over the first in the same manner of spreading, watering, and rolling, until the entire base was compacted into a dense, unyielding mass. After the second course had been watered and rolled, the entire surface was thoroughly scarified by the motor graders to a depth of at least 4 inches. It was then

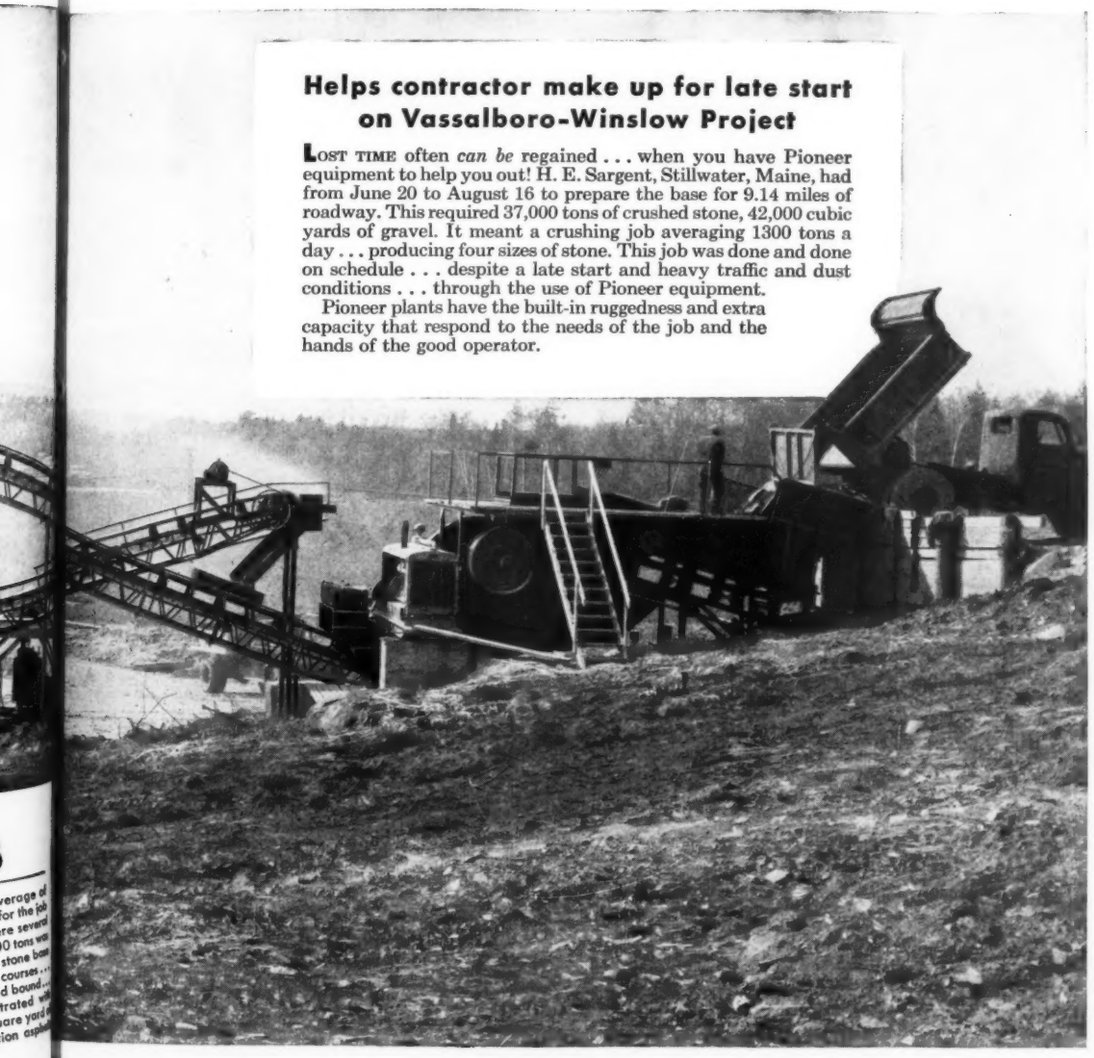
(Concluded on next page)

g will help you win

Helps contractor make up for late start on Vassalboro-Winslow Project

LOST TIME often *can be* regained . . . when you have Pioneer equipment to help you out! H. E. Sargent, Stillwater, Maine, had from June 20 to August 16 to prepare the base for 9.14 miles of roadway. This required 37,000 tons of crushed stone, 42,000 cubic yards of gravel. It meant a crushing job averaging 1300 tons a day . . . producing four sizes of stone. This job was done and done on schedule . . . despite a late start and heavy traffic and dust conditions . . . through the use of Pioneer equipment.

Pioneer plants have the built-in ruggedness and extra capacity that respond to the needs of the job and the hands of the good operator.



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Lime Rock Underlies Superhighway Strip

(Continued from preceding page)

shaped to exact crown and cross section by the grader blades, rewatered, and rerolled. The wooden forms were removed after the second course was laid, and the rollers were run so that the wheels lapped the base course and the adjoining dirt of the shoulders. In this way the shoulders were solidly compacted along the edge of the road base.

Next the base course was primed for the full 24-foot 4-inch width with RC-1 asphalt applied at the rate of 0.12 gallon to the square yard by an Etnyre 1,000-gallon distributor mounted on an International truck. The prime was covered with a light covering of sand, put on by hand and later swept off by a power broom in preparation for the blacktop paving.

Asphaltic concrete for the 1½-inch hot binder and 1-inch Type I surface course was supplied from the contractor's commercial asphalt plant permanently located along the road under construction at the upper railroad siding previously mentioned. It is an electrically driven 1½-ton pugmill plant. Maximum haul for the fleet of 12 to 15 International trucks carrying the material was 9 miles. The plant-mix was laid by two Barber-Greene Finishers, and compacted by a pair of Buffalo-Springfield 10-ton tandem rollers.

The finished pavement pitches at the rate of ⅛ inch to the foot from the center crown. The 10-foot shoulders have a slope of 1 inch to the foot. Fill slopes are 4 to 1, while the slope to the depressed center parkway is 5 to 1. Storm drainage is carried in pipes laid along the low line of this 40-foot strip dividing the two roadways.

Quantities and Personnel

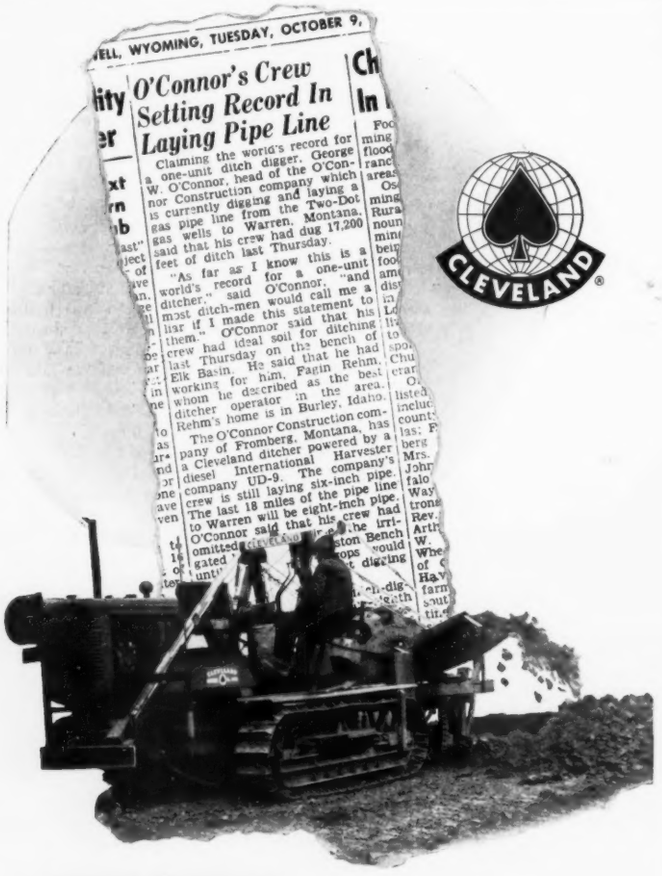
The major items in the 12.15-mile road contract covering the new half of the divided highway included the following:

Excavation	310,000 cu. yds.
Stabilizing subgrade	65,014 sq. yds.
Prime coat	37,000 gals.
Lime-rock base course, 8-inch	182,000 sq. yds.
Asphaltic concrete, binder	12,000 tons
Asphaltic concrete, surface	8,500 tons
Bitumen in mix	281,000 gals.
Culvert concrete	2,000 cu. yds.
Reinforced-concrete pipe, 18-inch	1,500 lin ft.
Re-laying 18 and 24-inch RC pipe	1,000 lin. ft.
Corrugated-metal arch pipe, 22 x 13-inch	2,000 lin. ft.

The Duval Engineering & Contracting Co. employed an average force of 50 on the project. E. D. Fambrough was Superintendent.

For the State Road Department of Florida, Claude W. Monroe was Project Engineer, assisted by Monroe Stokes. The Department is headed by Alfred A. McKethan, Chairman of the Road Board, with Sam P. Turnbull, State Highway Engineer. A. V. Shelton is State Construction Engineer, and John R. Slade, District Engineer.

Accidents don't happen, they are caused. Remember: safety always pays.


ELL, WYOMING, TUESDAY, OCTOBER 9,
O'Connor's Crew Setting Record In Laying Pipe Line
Claiming the world's record for a one-unit ditch digger, George W. O'Connor, head of the O'Connor Construction company which is currently digging and laying a gas pipe line from the Two-Dot gas wells to Warren, Montana, said that his crew had dug 17,200 feet of ditch last Thursday.
"As far as I know this is a world's record for a one-unit ditcher," said O'Connor, "and most ditch-men would call me a liar if I made this statement to them." O'Connor said that his crew had ideal soil for ditching last Thursday on the bench of Elk Basin. He said that he had working for him, Fagin Rehm, whom he described as the best ditcher operator in the area. Rehm's home is in Burley, Idaho.
The O'Connor Construction company of Fromberg, Montana, has a Cleveland ditcher powered by a diesel International Harvester company UD-9. The company's crew is still laying six-inch pipe. The last 18 miles of the pipe line to Warren will be eight-inch pipe. O'Connor said that his crew had

GEORGE O'CONNOR'S

CLEVELAND DUG 17,200 FEET OF TRENCH IN 9 HOURS

Even under ideal conditions 3¼ miles of 22" x 40" trench in one day is pretty fair digging for a single trencher. Naturally, CLEVELANDS don't set records like this every day. But even when they are digging only 200 feet per day under adverse soil and project conditions you can be sure that CLEVELANDS are performing just as profitably as George O'Connor's did for him. CLEVELAND's wide range of transmission-controlled *combinations of digging wheel and crawler speeds* give you the right speed for every job—just one of the many features which make CLEVELANDS preferred by men who base their judgment on *proved performance.*

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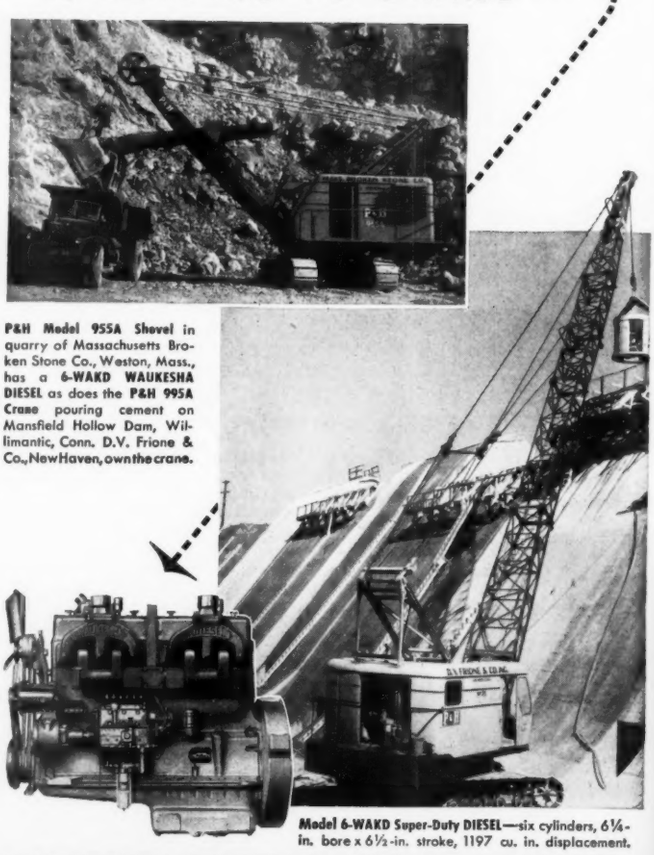
Quarries to Dams----



P&H Model 955A Shovel in quarry of Massachusetts Broken Stone Co., Weston, Mass., has a 6-WAKD WAUKESHA DIESEL as does the P&H 995A Crane pouring cement on Mansfield Hollow Dam, Willimantic, Conn. D.V. Frione & Co., New Haven, own the crane.

Model 6-WAKD Super-Duty DIESEL—six cylinders, 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displacement.

WAUKESHA Diesel POWER

139

● Trigger quick, but smooth and slick—the Waukesha Super-Duty Diesel snaps right into it, almost the same second the shovel operator puts on the power. It's that *fast recovery* that makes a Waukesha Diesel so different. And you can tell the difference, too—in loads per minute. Operators, contractor-owners, and shovel-makers agree on that. With Harnischfeger Corporation of Milwaukee, Wis., the Waukesha 6-WAKD Diesel is standard equipment on their P & H Model 955A 2½ to 3 cubic yard shovels, draglines, and cranes, that are so versatile on such a variety of construction jobs. Pictures show two of them at work.

Like all Waukesha Diesels, this Super-Duty Six has many exclusive design features. Most outstanding is the patented spherical combustion chamber. That's the *why* of Waukesha Diesels' unusual performance—the lively, responsive acceleration, smooth, shock-free operation, clean and complete combustion with high fuel economy and low maintenance. Get all the details—send for Bulletin 1415.

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Our Reader Service Dept. will send such articles pasted on standard file size sheets if you request it.

Use the Request Cards Between Pages 16 & 17 To Obtain Further Information or Printed Matter on Any Product Advertised or Described Editorially in This Issue

Use the Request Cards Between Pages 16 & 17 To Obtain Further Information or Printed Matter on Any Product Advertised or Described Editorially in This Issue

With the help of Carlon plastic casing, in 5-foot sections, demonstrators drill, case, pipe, and pump a 61-foot water well in 125 minutes.

Light Plastic Casing Speeds Drilling Work

A time-saving technique for drilling water wells was demonstrated in Virginia last year, near Washington, D. C. Using a packaged-unit portable drilling rig, three men drilled, cased, piped, and pumped a 61-foot well in 125 minutes. The rig consisted of a 4-wheel-drive one-ton Willys-Overland pickup truck, a Mobile Drilling, Inc., drill, and 5-foot sections of lightweight Carlon plastic casing.

After augers had dug a hole deep enough the men joined sections of the plastic casing, attached them to a well screen and expendable bit, and lowered the length manually into the hole until only a few feet of casing remained above ground. They guided a driving rod through the casing, joined it to the bit, and connected it to a power source. As the bit's reaming action cleaned the hole, they added casing and driving-rod sections above. They continued the operation until the screen reached well bottom, when they disconnected the driving rod from the bit and pulled it out. They then lowered Carlon rigid pipe, its sections joined by cemented sleeves, into the well and attached a pump.

Cart-Mounted Saw Cuts Concrete Patch

Additional uses of the Model HD masonry saw have been announced by Clipper Mfg. Co., Suite 635, 2800 Warwick, Kansas City 8, Mo. The cutting head of the unit can be mounted on a 4-wheel cart where it is ready to saw concrete or asphalt patches in floors, drives, and other paved areas. It also cuts trenches for sewer, water, or gas lines without spalling of the surrounding material, the company claims.

If the cart is placed on tracks, the unit can saw stone slabs, Transite sheets, precast stone, plywood, and Masonite.

Further information on this convertible saw may be secured from the company. Or use the Request Card at page 16. Circle No. 524.

If the cutting head of the Clipper HD masonry saw is mounted on a cart, it can cut concrete or asphalt patches.

Data on 17.5-Yard Scraper

An 8-page bulletin on the Model TC-S142 Terra Cobra self-propelled scraper has been released by Wooldridge Mfg. Co., Sunnyvale, Calif. The TC-S142 has a heaped capacity of 17.5 cubic yards, and is powered by a 225-hp Cummins diesel engine.

The bulletin shows operational features and mechanical details in a series of sectional, cutaway, and assembly views. It also includes complete specifications on the Model TC tractor and S142 scraper, including air-controlled power unit.

This literature may be obtained from the company by requesting Bulletin No. TC-707, or by using the Request Card at page 16. Circle No. 434.

SETS JOINT STRIPS FAST AND STRAIGHT

The Wheeler Pave-Template is a tool for setting joint strips of steel, or other hard material in concrete. Ideal for Highways, Streets, Airport Runways and other areas. Uniformly straight joints assured. Furnished in any length from 8' and up. Clips for aligning strips and cross-strips furnished.

Sets strips from ¼" to ¾" thick and any depth. Sets any length in less than one minute. No T-iron cutter needed. Sturdily built. Simple method of attaching strips and releasing them when set in concrete. Interlocking V-shaped steel strips in various sizes available. Send for full details.

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1 it withstands punctures, road shocks and cuts.
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Heavy-Duty Rollers Are Diesel-Powered

The trend toward dieselization of road-building equipment is indicated by the performance of seven diesel-powered asphalt-paving rollers recently put to work by George M. Brewster & Son, Inc., contractor of Bogota, N. J. The Buffalo-Springfield rollers are of the 3-axle tandem type and have a working weight ranging from 14 to 20 tons. Water-ballasted they weigh 18¾ tons and wet-sand-ballasted they weigh 20 tons. The rollers are powered by 3-cylinder General Motors diesel engines.

The installation of diesel engines in this equipment depended upon whether or not they could be installed with torque-converter drives in the space available in the engine compartment. The power plant selected was compact enough to meet this requirement, and its installation has meant a smooth power flow which drives the roller evenly under varying load and grade conditions, and cuts slippage of the driving roller to a minimum. The rolling time required to complete a smooth, even pavement has been reduced, reports Brewster Co., which first used the rollers on the Jersey Turnpike.

View along the Jersey Turnpike near Secaucus, N. J., where contractor George M. Brewster & Son, Inc., operated the first GM-diesel-powered asphalt-paving rollers to be produced by Buffalo-Springfield.

New Glass Absorbs Heat, Reduces Glare

A greenish glass which absorbs the sun's heat, reduces eyestrain, and keeps color-fading to a minimum is the newest product offered by Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh, Pa. Solex may be bent, laminated, or tempered for use in many flat-glass applications: trucks, crane cabs, autos, building construction, etc. It takes the heat out of sunshine without sacrificing light transmission, the manufacturer says.

Although Solex transmits approximately 72 to 74 per cent of visible sunlight, it transmits only about 20 per cent of the infra-red heat rays. It excludes approximately 65 per cent of direct solar radiation by absorbing 60 per cent and reflecting 5 per cent. Its use can reduce room or vehicle interior temperatures 10 to 20 degrees F, the company says. Double-glazed window units with an exterior light of Solex and an interior light of regular plate glass are said to reduce heat gain in summer and lower heat costs in winter. A double-glazed unit with a ¼-inch air space is the equivalent of an 8-inch brick wall in terms of heat gain or loss, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 418.

American Bitumuls President

C. W. Turner is the recently elected President of American Bitumuls & Asphalt Co., San Francisco, Calif., a subsidiary of Standard Oil Co. of California. C. W. Stewart, formerly President, fills the new position of Vice Chairman of the Board of Directors. Mr. Turner, who took over his new job at the beginning of the year has been District Manager of Standard Oil's Honolulu branch.

"Tag Master"
"Tops" in Bucket Control

As your clamshell "flies through the air with the greatest of EASE," watch the eyes of the "sidewalk superintendents" POP!

You, too, will be delighted with the EASE with which you *cast* the clamshell, or *snub* it, or *twist* it, getting into hard-to-reach corners and picking up hard-to-manage rocks.

You'll find the tagline pull *uniform* at all bucket levels and *adjustable* to fit any job.
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HELP CONSERVE STEEL

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FOR FLOOR and ROOF CONSTRUCTION and ROOF PURLINS

Framework of Robert Ave. School, St. Louis, Mo. • V. Harry Rhodes, Commissioner of School Buildings • Contractor: Juengel Construction Company

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By using steel joists for roofs and floors you can aid in conserving critical steel for construction *and* help speed your job to completion.

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JACKS

Lift or Lower the Load Notch by Notch—cannot be Tripped.

With Simplex Ratchet Lowering Jacks minimum toe clearance is necessary. Loads are usually lifted from the ground to the toe of the jack by pinch bars or wedges. Only Simplex Jacks provide equal lift capacity on toe or cap. No other jacks offer such a combination of low cost and all-purpose utility. In fast jacking action—extra-safety features—and rugged strength for longer life, Simplex Ratchet Lowering Jacks give you more for your money! Available in capacities of 1½ to 35 tons. Write today for Bulletin: Industrial 49.

SAFETY SUGGESTION—Use thin wood block—Don't lift or lower steel against steel.

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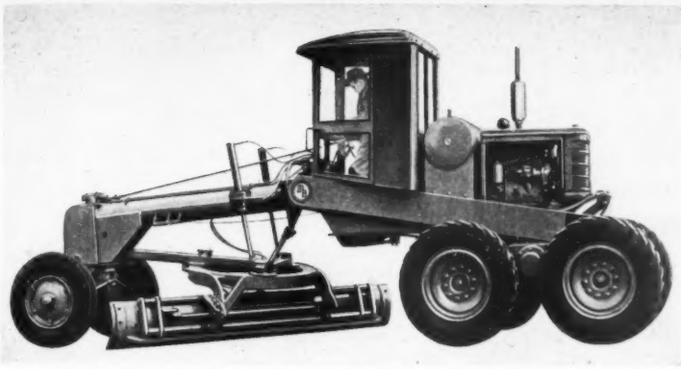
TEMPLETON, KENLY & CO.
1002 S. Central Ave., Chicago 44, Ill.

New 40-Hp Graders

A new series of road graders, the Model 42 single-drive and Model 44 tandem-drive, has been developed by Meili-Blumberg Corp., New Holstein, Wis. They are in the 40-hp class, weigh up to 15,000 pounds, and carry a 10 or 12-foot blade. They are said to be suited for medium-class ditch-to-ditch service, on 1 to 1 slopes.

The general feature of these units is that they can be purchased to fit particular job requirements or budget limitations: with single or tandem drive; gasoline or diesel engine; with or without a power circle turn, leaning front wheels, blade side shift, front-end loader, scarifier—plus a wide selection of tire sizes both front and rear. Other features cited by the company include hydraulic control; chain-driven tandem with heavy axles; 5 travel speeds forward and one reverse; 86-inch blade base; a 19-inch front-axle clearance; and a 7,350-pound blade pressure.



Meili-Blumberg's new road graders are in the 40-hp class. Model 42 is a single-drive and Model 44 is a tandem-drive rig.

The single-drive Model 42 may be equipped with tire sizes ranging from 10:00 x 32 to 14:00 x 32 to provide as much traction as the tandem, or more. On the tandem-drive unit, tires range from 10:00 x 24 to 12:00 x 24.

Further information on these new graders may be secured from the company. Or use the Request Card at page 16. Circle No. 451.

Snow-Clearing Equipment

A bulletin about heavy-duty snow-fighting equipment is available from Walter Motor Truck Co., 1001 Irving Ave., Ridgewood, Long Island, N. Y. It pictures the Walter Snow Fighter clearing snow on highway and airport pavements, and it discusses equipment requirements, plan of attack, precautions, etc., for various types of storms.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 431.

Conklin for Yale & Towne

James H. W. Conklin is named General Sales Manager of the Philadelphia Division of The Yale & Towne Mfg. Co., manufacturer of materials-handling equipment, in succession to James P. Kinney, who has taken over the company's distributorship in Los Angeles and Southern California. Mr. Conklin was formerly with the Pangbourn Corp., Hagerstown, Md.

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TILDEN ROTARY KONKRETE KORE DRILLS

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- Diameters 3/16" to 4" in stock
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- Quiet operation - no hammer

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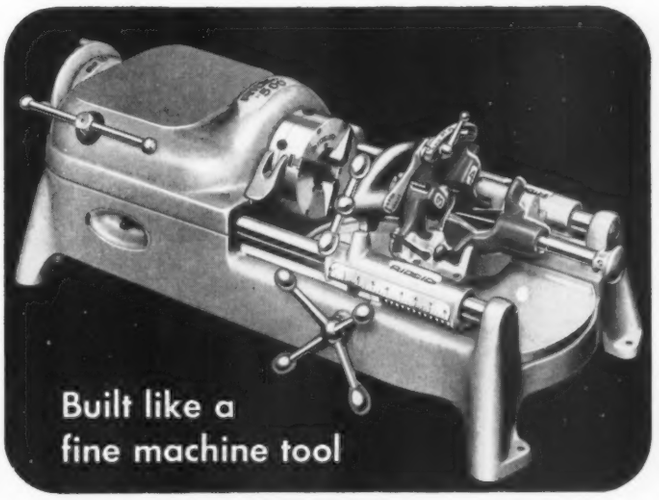

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"Cat-Blown" Asphalt Lines Lateral Canal

Contractor Develops Efficient Outfit for Applying Tough Asphaltic-Membrane Lining on Columbia Basin Project

By RAYMOND P. DAY

• CATALYTICALLY blown asphalt, specially processed to make a tough durable canal lining, had been applied to approximately 25 miles of canals before its recent application to Canal EL-20, one of the main distribution laterals of the Columbia Basin system near Moses Lake, Wash. This project called for about 25 miles of lining. The material was placed by Columbia Asphalt Paving Co. of Yakima, under a subcontract with J. A. Terteling & Sons, Inc., of Boise, Idaho. The Terteling organization had an $8,722,000 prime contract with the U. S. Bureau of Reclamation including the 4½ miles of Rocky Coulee Wasteway, and 14 miles of concrete-lined main canal.

A. J. Turnbull and T. R. Lonon, co-owners of the Columbia Asphalt Paving Co., were the pioneer contractors for the application of canal asphalt in the Columbia Basin. With limited experience in canal lining but plenty of experience in highway asphalt construction, the two partners and R. A. Tornow, their General Field Superintendent, had to build the special equipment required for this work almost from scratch.

C. & E. M. Photo

To sprinkle water just ahead of the asphalt application in the tricky sand of El-20 Canal, hand hose under pump pressure was the right answer. Truck-mounted sprinkling tanks got their water through standpipes from a main trunk line.

The job resembled nothing which has ever been done before. Canal EL-20 ranges from 10 to 2-foot bottom width, has 1¾-to-1 sideslopes, and vertically is from 3 to 12 feet deep. In the first portion of the work, the canal passed through terrain so rocky that unusual applications of standard equipment had to be developed in cooperation with Project Manager Al Perry of the Terteling organization. Some lining was necessary in through cuts, through fills, and combinations of the two. Some had to be laid on sand so tricky it would shift at the slightest disturbance. Despite these obstacles, Columbia regularly used up the entire output of its asphalt supplier, 8 carloads a week, in 5 days. Project officials and some of the USBR engineers believe it was one of the most efficient of the asphalt-lining organizations that have been developed to date.

Asphalt Properties

Catalytically blown asphalt for canal linings was developed jointly by Lion Oil Co. of El Dorado, Ark., and by Denver engineers of the USBR in answer to the need for a tough, durable, low-cost lining which would be easy to apply and would hold the water in the ditch with a minimum of seepage. Compared to ordinary paving asphalt or ordinary air-blown roofing asphalt, the material is much more ductile at low temperature and much less ductile at high temperature. Expressed another way, temperature extremes affect the catalytically blown material but little. A 50-60 "cat-blown" asphalt at 70 degrees will still have a penetration rating of about 35 at 32 degrees, and not more than about 90 at a temperature of 115 degrees. It is tough, leathery, resilient, durable.

The material is manufactured by blowing air through industrial asphalt at a temperature of about 350 degrees, and introducing phosphoric pentoxide (the catalyst) during this process. While this explanation is oversimplified, the process changes the chemical nature of the petroleum hydrocarbons. It differs from ordinary refining methods, where various petroleum products are distilled off, ahead of the asphalt. In the "cat-blown" process, a ton of industrial asphalt makes very nearly the same amount of material suitable for canal lining, in spite of the presence of many of the original oils in the raw industrial product.

Trumbull Refining Co. of Portland, Oreg., produced the material for this job from Shell asphalt. The entire output, 8 carloads a week, was shipped to Wheeler, Wash., to a railroad siding where job equipment then took over. While some of the cars arrived cold, most of the material arrived at pumping temperature—that is, at 350 degrees.

(Continued on next page)

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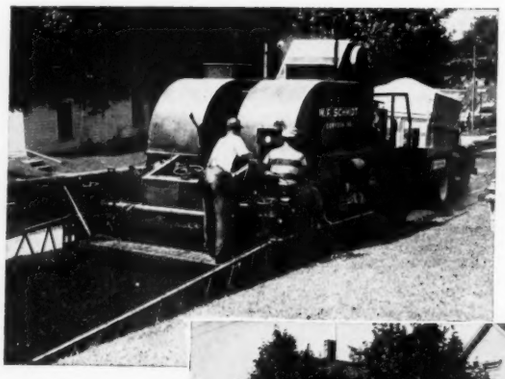
Cuts Resurfacing Time-and Costs



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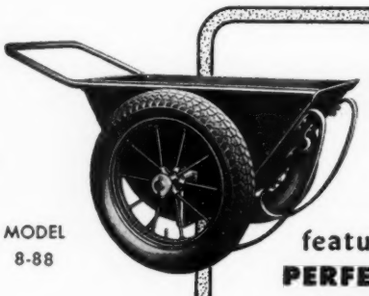

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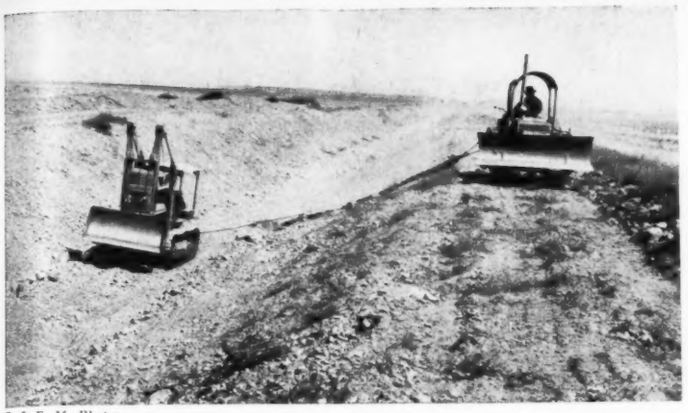

C. & E. M. Photos

At left two Caterpillar D4's—one on each end of a D8 track (tread side up)—drag the canal banks smooth. In the other picture a Link-Belt Speeder 1½-yard dragline backfills by casting the remaining blanket material.

Canal Preparation

When Terteling's men and equipment finished the rough canal, they left it as smooth as could reasonably be expected with dragline equipment. Material for the 18 and 20-inch earth cover over the asphalt membrane had been stockpiled along both sides of the ditch, where equipment could reach it. Nevertheless, the slopes and bottom were far from ready for asphalt, because of many rocky places and because of weeds which had grown up along the canal sides.

The worst place for rock was at the start of the project. There, large round niggerheads up to 18 inches in diameter protruded, with many smaller stones scattered over the slope. It was not the kind of surface that could be sealed easily with any material, except perhaps a clay cover, which was neither available nor specified.

Al Perry and R. A. Tornow, the two field leaders who worked together with exceptional cooperation, got an old track from a D8 Caterpillar tractor. Using it with the tread side up, they hooked two Caterpillar D4's, one on each end, to the heavy flexible weight. The forward-pulling cat was placed on the berm at the top of the canal, and the trailing machine worked from the bottom. In the worst places it took as many as six passes to dislodge all the slope rocks and work them down to the bottom.

In the bad rocky section, a trench had to be dug to hold the excess rocks. But under ordinary conditions, they were mashed down into the canal bottom by a 10-ton Galion tandem steel-wheel roller. A smaller steel pull roller, rolled up and down the slope by the power-control winch on a tractor, smoothed the sides. The finished surface, in preparation for asphalt, was generally smooth and dense.

Asphalt Application

Specifications for asphalt membrane called for an average application of 1.25 gallons per square yard, to make a coating approximately ¼ inch thick. Because of unfavorable rocky conditions, it was necessary to overrun slightly, but the average total in the overrun sections was not more than 1.80 gallons per square yard.

At the Wheeler railroad siding, Columbia Asphalt Paving Co. set in enough equipment to heat the material in short order. A Cleaver-Brooks 2-car tank heater was spotted there, together with a Bros retort. The latter machine has several built-in safety features

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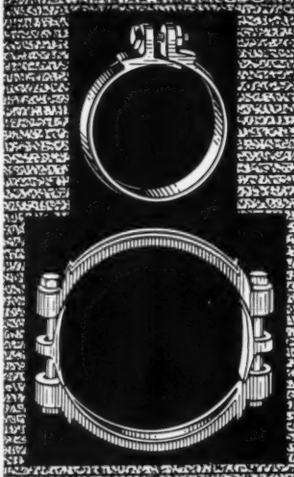
Quality and Value



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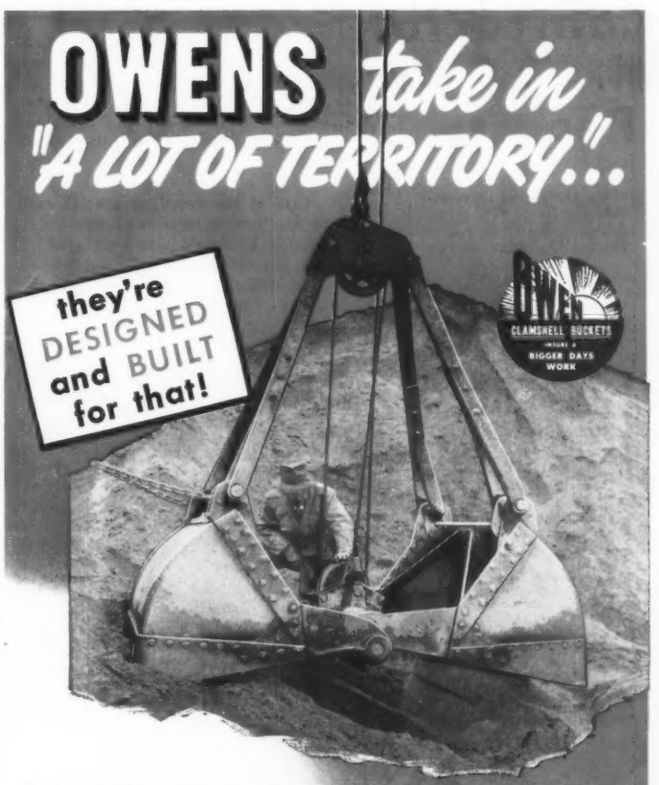

"A Mouthful at Every Bite," with more bites per day takes in a "lot of territory," whether you're operating in sand, gravel, mud or coal with an Owen Bucket on your boom.

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"Cat-Blown" Asphalt Lines Lateral Canal

(Continued from preceding page)

which saved Tornow a lot of worry: an automatic by-pass on the pressure pump to prevent damage in case of excessive pressure, and a safety device, thermostatically controlled, which shuts off the burners if the asphalt gets too hot.

One of the things Tornow had to be careful about was a wedge-shaped slug of solid asphalt which always built up at each end of the car unless the material was in full circulation. For that reason, heat and circulation through the Bros retort were maintained until the tank cars were each unloaded. The heating equipment was sufficient to raise the temperature of a car of asphalt 50 degrees an hour.

The two subcontracting partners really jumped in off the deep end, figuratively speaking, when they invested money in asphalt application and supply equipment to be used between the railroad siding and the final point of placement. The main transfer unit which hauled asphalt out to the canal was a 5,000-gallon tank mounted on a GMC truck. It was equipped with two sets of 6-inch heater tubes heated by two 4-inch Aeroil kerosene burners, and also carried a standby butane heater. A 2,000-gallon truck-mounted transfer unit equipped with heaters similar to those on the 5,000-gallon tanker was used, too, but the big 5,000-gallon unit was the workhorse of the outfit.

C. & E. M. Photo

Alfred Perry (left), Project Manager for J. A. Terteling & Sons, Inc., Boise, Idaho, talks it over with Cliff Emmons, his General Superintendent.

Out at the canal, a special asphalt application rig capable of carrying 3,800 gallons by itself was employed. This unit consisted of a GMC 6 x 6 truck, a 3,800-gallon tank, and a 3-inch Fairbanks-Morse high-pressure asphalt pump driven by a Le Roi engine through a set of Ford truck reduction gears. It was absolutely imperative in handling this tricky stiff canal asphalt to have a reverse gear available on the pump so the distribution bars and hose could be emptied rapidly in case of a shutdown. Just 2 minutes' exposure even on a hot day was enough to cause the material to freeze. The distribution machine also carried a revolving side boom 30 feet long and 3 inches in diameter, to reach over the center of the canal. From the end of this boom a 1¼-inch flexible hose was used to connect with the spraybars.

Slope asphalt was applied in two passes, using a 20-foot bar equipped with ⅛-inch nozzles. One of the secrets of successful slope congealing seemed to be to use plenty of sprinkling water just ahead of the asphalt application. Early in the job, Terteling established a main trunk line to carry mixing water for the concrete lining on the other part of the project. Standpipes from this line were used by the truck-mounted sprinkling tanks to obtain the required water. The water was sprayed on by hand hose under pump pressure. After the two slopes were shot, the bottom was covered in a single pass. Ordinarily a spraybar was used here, too. Occasionally, however, hand spray equipment had to be used. On the smaller ditches (2 to 3-foot bottom) a spraybar was used to cover the complete ditch perimeter in one operation.

The presence of numerous checks, drops, turnouts and other such typical irrigation structures limited greatly the number of long straight runs.

Superintendent Tornow soon learned to organize his operations around the availability of asphalt. If he had several cars of asphalt on the track, the

(Concluded on next page)

Contractor H. H. Auch Reports...

● "We are happy to report . . . that the David White Universal Level Transit has our wholehearted approval."

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It is with pleasure that I write you regarding the performance of our new David White Universal Level Transit, Serial #58114.

The ease and speed with which it is set up and the accuracy of the readings taken most certainly belie its actual cost. The level has been on our largest job since it arrived and the Superintendent of the job prefers to use this David White in preference to a which requires much more "set up" time; and hence, for the ordinary shots is not near as popular on the job. We are happy to report to you that this David White Universal Transit Level has our wholehearted approval.

Very truly yours,
GEO. W. AUCH COMPANY
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Here's why you'll like a DAVID WHITE UNIVERSAL LEVEL TRANSIT too . . . The David White "Universal" Level Transit is the most practical, complete builder's instrument on the market. Now available in a new improved model—complete with internal focusing, coated optics—guarded vertical arc — in fact every feature to assure you lifetime durability and accuracy. Write for name of our nearest dealer.

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This Littleford "Spray Master" Pressure Distributor with its Full Circulating Vacuum Flow Spray Bar applies asphalt, tar, emulsion or road oil with such ease and at such a low cost, it's amazing. It's engineered to give Highway Departments and Contractors the labor-saving unit that insures less expenditures for those black-top roads, highways and streets. Remember when purchasing Black-Top Construction units, LB means Littleford Bros. and Lesser Budgets for the best equipment.

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"Spray King" Pressure Distributors—"Kwik-Steam" Vapor Generators
"Vari-Packer" Rollers—"Tankar" Heaters—Road Brooms—Tar Kettles
Emulsion Sprayers—Trail-O-Rollers—Supply Tanks—Asphalt Tools

preparation crew worked overtime to get the longer sections ready. If only one car was there, the application crew dropped back and made the necessary connections around structures. It was not at all unusual for the outfit to shoot between 1½ and 2 cars per day, covering about 15,000 square yards. On peak days, when preparation was far enough ahead, 3 carloads of asphalt were applied.

The application temperature of the 50-60 penetration material was generally 350 to 375 degrees. To get that application temperature, the asphalt had to be heated to about 420 at the railroad siding.

Cover

The freshly applied asphalt congealed or froze almost on contact, and hardened to a tough, rubbery consistency. However, if it was exposed to the hot summer sun for periods much longer than a week, it tended to sag and stretch. For that reason, enough cover material to protect the membrane had to be applied as soon as possible. Here, too, some experimenting was tried. Backfill cover was put on by Terteling's crews and equipment, and several methods were attempted.

One of them was this: Working through the day, a Caterpillar D8 with an angle-blade dozer cut material out of the borrow stockpile and moved it to a big windrow at the edge of the canal. All the material this machine could get ready was laid out ahead. Then, just at daylight when the asphalt was at its coolest temperature, the dozer made a single pass and shoved the cover material over the edge. It spread nicely as it slid down slopes 3 feet or under; over that height, it was found that the cover tore the lining, so that method was not used. A small ⅜-yard dragline followed the dozer, casting cover material over the canal bottom, just thick enough to protect the membrane.

Following this operation, two draglines finished the cover. A Link-Belt Speeder K-375, with a 50-foot boom and a 1½-yard bucket, worked from one side. A 2½-yard Northwest worked from the other side. The machines spread the remainder of cover material, which was then smoothed down to make a finish job. The bottom was smoothed by dozer, while the tractor-track scheme was used on the sides. The gravelly rocky earth cover soon received its first water, for all of the Columbia Basin Project finished so far was wet the first time late last fall. Target date for the first water on the sills of South Coulee Dam was July 29. By September 1, water was expected to be at Long Lake and ready for distribution to East Low Canal shortly thereafter.

Terteling Finished on Time

Terteling put the final touches on its work by the December 31 scheduled deadline. The organization had done one of the biggest sections of all the East Low Main Canal since the work was started in June, 1949.

Probably because of economics and because many reclamation canals now consist of partly built-up sections, berm tops are getting narrower and narrower, and it is becoming increasingly tough for contractors' standard equipment to work after the dirt is finished. Some contractors' officials believe that as a result of this trend it may soon be necessary to develop newer methods of placing the conventional lining.

It is also believed that the success in placing the newer-type asphalt lining will cause the use of this material to spread, especially in the laterals and secondary distribution canals where its use is clearly indicated.

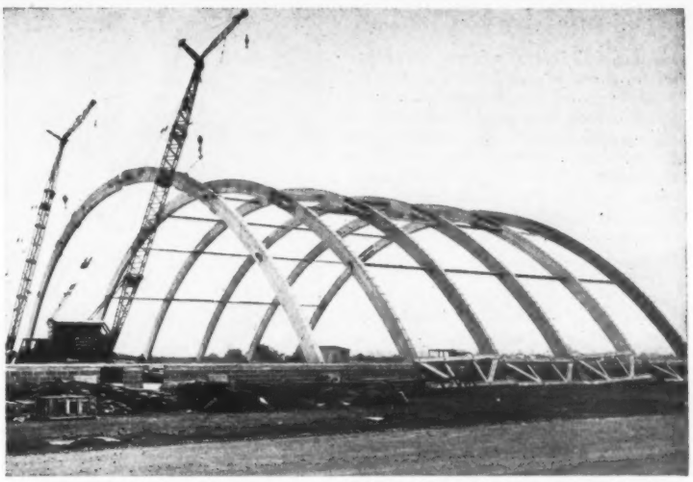
N. Y. Engineers Re-Elect

John F. Hennessy, of Syska & Hennessy, Inc., has been re-elected President of The New York Association of Consulting Engineers for a second term. Other officers re-elected were: Vice-President—Burnside R. Value, of Stevenson, Value, & Knecht; Secretary—W. Donald Christie; and Treasurer—Harry H. Bond. The following were elected to the Executive Committee, which also includes the officers: Leland Edwards, of Edwards & Hjorth; V. L. Falotico, of V. L. Falotico & Associates; and Matthew Hiller.

Catalog on Radial-Arm Saw

A new catalog describes the line of radial-arm saws made by Delta Power Tool Division, Rockwell Mfg. Co., 600 E. Vienna Ave., Milwaukee, Wis. It gives complete specifications on all four models and illustrates special accessories such as molding cutter head sets, drill-press attachments, mortising attachments, and dado head sets.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 504.



Wigton-Abbott Corp., Plainfield, N. J., builds a $250,000 private airplane hangar for Continental Can Co. in Morristown, N. J. The 3-hinged laminated wood arches will support a corrugated asbestos roof 45 feet high. The 180 x 160-foot building will contain machine-shop and repair facilities.

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Lull District Mgr. in West

Aubrey L. Stains is District Manager in the western area for Lull Mfg. Co., Minneapolis, Minn., manufacturer of the Shoveloader, tilting-tower Universal loader, fluid-driven sweeper, and Traveloader. With headquarters in Sacramento, Calif., Mr. Stains will cover the territory of Arizona, California, Nevada, Utah, Wyoming, Idaho, Oregon, Montana, Washington, Colorado, and the Canadian provinces of British Columbia and Alberta. He succeeds Pat Lamb, who is now Assistant Manager of the company and has his offices at Minneapolis.

Pekor Iron Works Personnel

Two former executives of Pekor Iron Works, Columbus, Ga., have returned to the company. Charles F. Pekor, Jr., is General Manager, succeeding his brother R. Briggs Pekor, who recently resigned to organize a new business. Clyde A. Butler, who served as General Superintendent of the company before 1939, returns to the same position.

Hewitt-Robins idlers, which supported the Bull Shoals aggregate conveyor, are cleaned and painted for resale to Consolidated Mining & Smelting Co., Waneta, British Columbia. They show no signs of wear, in spite of 2½ years' service and a total of 4,600,000 tons of rock carried.

Long-Lasting Idlers

Fourteen thousand idlers (rollers) supported the 7-mile conveyor belt that moved 4,600,000 tons of Ozark rock to build Bull Shoals Dam on the White River in Arkansas. The dam is now finished—but the idlers aren't. So far from it, in fact, that of 6,000 recently inspected, only four had to be discarded. The remainder, cleaned and repainted for sale, are as good as new, according to Harvey Slocum, Superintendent of the Bull Shoals project.

The idlers, made by the Robins Conveyors Division of Hewitt-Robins, Inc., New York, N. Y., had nearly 2½ years of continuous service, but they are in such good condition that the first 6,000 have been resold to the Consolidated Mining & Smelting Co., of Waneta, British Columbia, under a new idler guarantee. Approximately 3½ miles of conveyor pulleys and motors are going along with them.

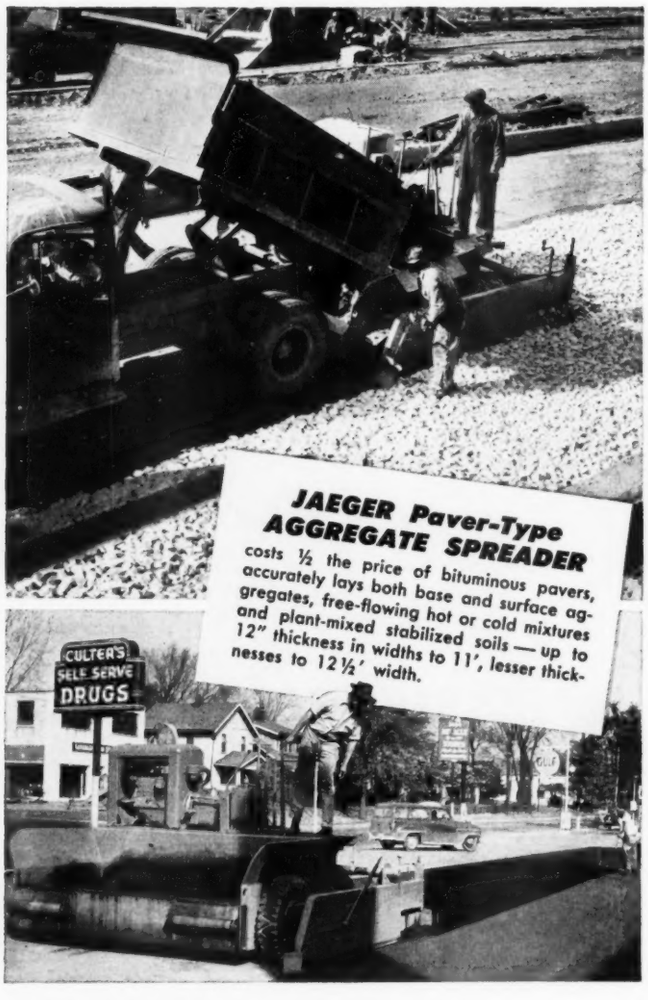
Mr. Slocum remarked that there was no apparent wear on the idlers and that their performance and the low maintenance and operating costs for the whole system fully justified the use of belt conveyors for projects of the magnitude of Bull Shoals Dam.

The idlers consist of three tube-shaped rollers which form a flat-bottomed "V". They are placed every 4 feet along a conveyor with self-aligning idlers at strategic points to hold the belt in line. Lubrication is required from one side only, thus reducing maintenance time.

LeTourneau Promotes Way

John H. Way has taken over the post of District Sales Representative in the west for R. G. LeTourneau, Inc., Peoria, Ill. His headquarters are at Denver, Colo., and his territory covers the states of Colorado, Wyoming, Montana, and Idaho. Mr. Way was with LeTourneau from 1939 to 1942. From 1948 until his present appointment he was a member of the sales staff of LeTourneau Distributor Contractors Equipment & Supply Co. at Albuquerque, N. Mex.

Highway base, secondary road or black top drives—Lay them at less cost


JAEGER Paver-Type AGGREGATE SPREADER
costs ½ the price of bituminous pavers, accurately lays both base and surface aggregates, free-flowing hot or cold mixtures and plant-mixed stabilized soils — up to 12" thickness in widths to 11', lesser thicknesses to 12½' width.
CULTER'S SELF-SERVE DRUGS

Designed to meet the need of both large and small contractors and highway departments, this low cost spreader lays many types of materials, in a wider range of widths and thicknesses, with the accuracy required for highway, street and airport base and both the base and top of secondary roads, parking lots and drives. Crawler or 4-wheel traction is on subgrade to avoid displacing loose material. Straightedge runners control level of strike-off. Blends joints; can lay flush to curbs, headers. Two models, to work with all size trucks.

For details, see your Jaeger distributor or send for Catalog SPS-1.

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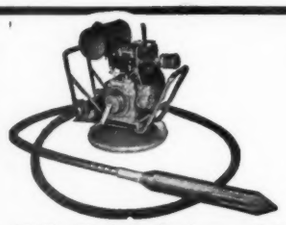

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Elkhart 9 White Mfg. Co. Indiana

A Westinghouse mechanic uses an Ingersoll-Rand Impactool with extension to remove the hanger cover plate on an elevator door at the Lamar Hotel, Houston, Texas. Time for ripping out old door track, hanger, and closer—10 minutes instead of 1½ hours.

Elevator-Door Job Speeded by New Tool

One tool doubled the productivity of a mechanic and his helper in the installation of three new elevators in 16-story Lamar Hotel, Houston, Texas.

The tool in question was Ingersoll-Rand's electric Impactool, and with its help Westinghouse completed in 12 days a job that was scheduled to take 24. Forty-eight old hand-operated doors had to be replaced with new power-activated doors, and the Impactool, with an extension for hard-to-reach holes, eased the work of screw-driving, bolt-running, and tapping. The result was that a 2-man team was able to handle four door openings in a day instead of the two they could manage with the usual hand tools. Since the Impactool is light and the impact mechanism eliminates transmission of torque to the handle, it does away with much muscle fatigue and makes jobs on which the tool is used more attractive to skilled men, Ingersoll-Rand claims.

Further information on the Impactool may be obtained from Ingersoll-Rand Co., Phillipsburg, N. J. Or use the Request Card at page 16. Circle No. 506.

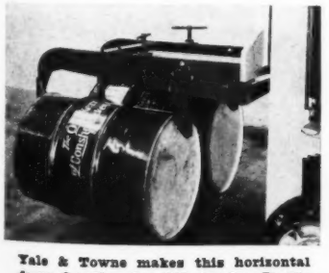
Drum-Handling Device

A horizontal drum handler that can be attached to any fork truck without removing the forks or making any hydraulic or mechanical connections is available from the Philadelphia Division, Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15, Pa. A self-contained automatic unit, it fits over the forks and is fixed to them with two screw-type clamps.

One or two standard drums can be picked up with the drum handler by lowering it over them while the truck is slowly backing away. The rear clamps are spring-loaded and snap under the lip of the drum. When the drums are lifted, gravity action locks the clamping hooks in place. For depositing, the drums are lowered, the truck is moved forward (stretching the springs on the rear clamps), and as soon as the forward clamps are free the channels on the truck are tilted back. The truck is then backed away.

The company points out that loads will not drop with sudden stops, when traveling over a rough surface or when truck channels are tilted. The attachment weighs 270 pounds and permits the drums handled to be filled with any common material. Drums may be stacked to any height within the lifting range of the truck.

Further information on these drum handlers may be secured from the company. Or use the Request Card at page 16. Circle No. 495.



Yale & Towne makes this horizontal drum handler for lift trucks. It fits over the forks and is fixed to them with two screw-type clamps.

Concrete Pipe Co.'s New Lab

With the object of improving its final product and at the same time reducing production costs, Kerr Concrete Pipe Co., East Paterson, N. J., has installed a new quality-control laboratory. The 21-year-old firm manufactures sewer pipe from 6 to 90 inches and upward in diameter. In the new laboratory daily performance tests are made on all materials going into the batch, and on the finished pipe. By means of aggregate-moisture tests, sieve analyses, and cylinder tests, the operator can now make adjustments to compensate for such slight variations as he may find in the materials supplied to the plant.

Kerr is optimistic that the new laboratory will fulfill its two prime functions—improve the company's product, and reduce manufacturing costs. Already, in the short time it has been in use, the lab has enabled Kerr to reduce the cement factor in its pipe while maintaining or increasing strength by proper proportioning of aggregates.

For Your Clipping File

If you wish to keep on file any articles in CONTRACTORS AND ENGINEERS MONTHLY, and you find it inconvenient or undesirable to cut up your issue, let us know which articles you are interested in. We'll be glad to send clippings, pasted on 8½ x 11 sheets, ready for your reference file.

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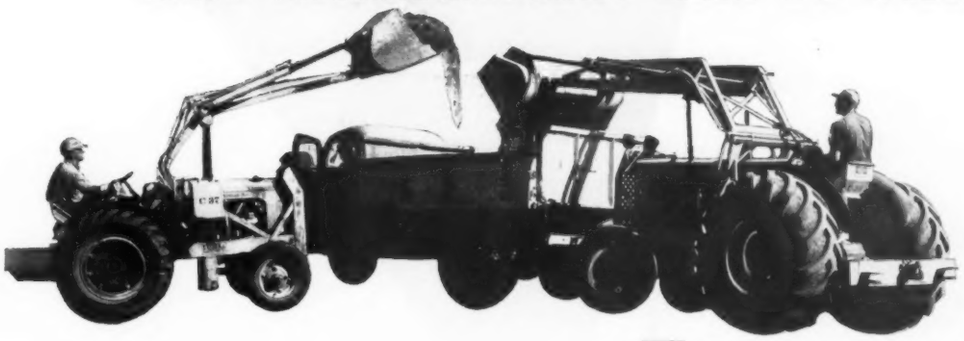

UTIL 51 h.p. High-turbulence, slow-speed, 51 h.p. engine is the power and economy leader . . . 6 shuttle speeds cut job time . . . 18 roller bearings in steering and front axle assembly for easy handling of capacity front-end loads.

Right Job Equipment

Profit-wise operators find that the wide *choice of heavy-duty attachments* designed for MM Industrial Wheelers handle a great number of jobs in less time. For many jobs RTI or UTIL Wheelers may be equipped with both front and rear mounted attachments that make both ends pay.

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The right attachments designed to match the power and weight of MM Industrial Wheelers are rigidly mounted to make the unit *last longer* and provide larger capacity. Front axle and tire capacity are rated at 5,000 and 12,000 pounds. MM Wheelers may be equipped with ½ up to 3½ yard buckets depending on material to be handled.

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Three-Application Surface Treatment

Emphasis on Hand and Drag Brooming as Well as Rolling Prevents Gravel Loss on 10.3-Mile Bituminous Road Job

• LAST year the Louisiana Department of Highways extended the pavement on State Highway 37 an additional 10.3 miles with a three-application bituminous surface treatment. The job started at the end of the existing blacktop near Greenwell Springs, about 20 miles out of Baton Rouge, in East Baton Rouge Parish. It ran northeasterly toward Grangeville, ending at the East Feliciana Parish line.

This stretch of State 37 was a dusty gravel road when the Department of Highways awarded a contract for the improvement to T. W. Kleinpeter Co. of Baton Rouge, La., on its low bid of $156,523.58. The project included grading and shaping the roadway, drainage structures, gravel base course, and a three-application bituminous surface treatment. A paved surface was particularly needed on this highway which is subject to heavy truck traffic in gravel hauling from commercial pits beyond the north end of the job to the Baton Rouge area.

The existing road had a variable width, averaging 18 to 20 feet, with a good alignment that was followed throughout the improvement. The new surface is 20 feet wide, flanked by shoulders 3 to 4 feet in width.

L. & E. M. Photo

An Etnyre distributor at the start of seal-coat operations on Louisiana State Highway 37. T. W. Kleinpeter Co., Baton Rouge, was the contractor.

Base Course

Construction got underway in November, 1950, with the laying of a sand-clay-gravel base course, 7 inches thick x 24 feet wide. The Louisiana Sand & Gravel Co. supplied the base material from one of its pits 10 miles from the job, delivery being made by the supplier's trucks which end-dumped the sand-clay gravel over the gravel road. Two motor graders spread the gravel on the roadway where it was left to be compacted by traffic.

In April of last year the contractor returned with his motor graders and rebladed all the loose gravel into a windrow down the center of the road. The material was then spread back evenly in two 3½-inch layers and shaped to grade. The base was wet down from spraybars at the rear of two 1,000-gallon tank trucks mounted on Fords, and compacted by a pair of rubber-tire rollers pulled by a John Deere and a Ford-Ferguson rubber-tired tractor.

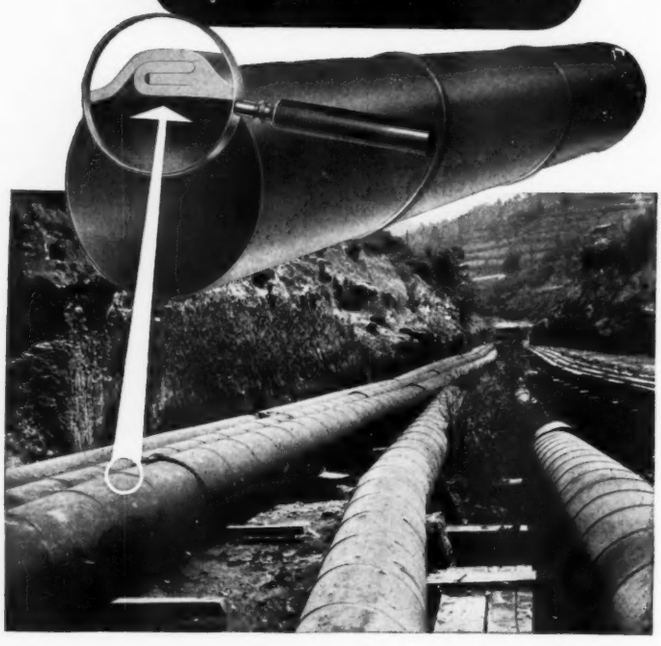
Rolling continued until the base was dry. The road was then opened to traffic for a 30-day period during which time the course was closely observed for any soft spots. When a few were detected, more material was added, wetted, and rolled to bring the base up to a firm, even grade.

Prime Shot

Then the smooth, well compacted base course was primed to a width of 21 feet with P-1 cutback asphalt applied at the rate of 0.25 gallon to the

(Continued on next page)

How NAYLOR gives you EXTRA STRENGTH in Light-weight Pipe



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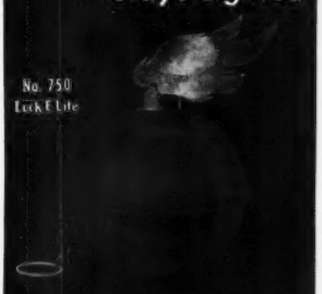

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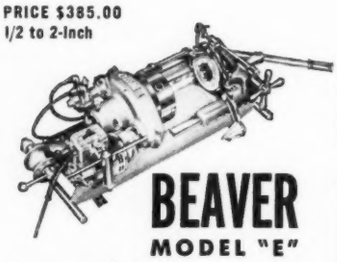

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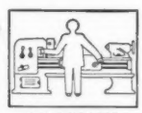
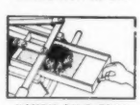
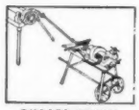
MODEL "E"
pipe and bolt machine


RIGHT-HANDED

GEARS RUN IN OIL


HANDY CHIP TRAY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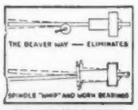

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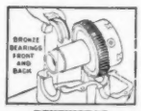

RENEWABLE BRONZE BEARINGS

C. & E. M. Photo

An Ingram 3-wheel roller and an Austin-Western tandem roll in the seal gravel.

C. & E. M. Photo

A Grace drag pulled by a Minneapolis-Moline tractor brooms the surface of the road.

square yard at a temperature of 125 degrees F. The 21-foot width of prime, or 6 inches beyond the surfacing on each side, checks raveling along the edges of the pavement. It was applied, full width at a time, by an Etnyre 925-gallon distributor mounted on a Chevrolet truck. Nozzles on the conventional rear spraybar were 4 inches apart.

All bitumen for the project was supplied by the Standard Oil Co. at Baton Rouge, and delivered to the job site in one of the supplier's 4,250-gallon transport trucks. Midway of the project the contractor set up four storage tanks for the bitumen, with 3 tanks containing 1,200 gallons each and the fourth holding 5,400 gallons for a total storage capacity of 9,000 gallons. A Grace Rapid Fire car heater was stationed at the tanks to heat the bitumen to the desired temperature. The pump on the distributor transferred the bitumen from the storage tanks to the distributor.

In applying the prime, a stringline was stretched out along the left side of the road for the guidance of the distributor driver. He also kept his eye on the tachometer that was mounted on the left running board, thus relating the speed of the vehicle to the amount of bitumen being applied. A guide rod from the left end of the truck assisted the driver in keeping the distributor parallel to and the same distance from the string guide line.

Bituminous Surface Treatment

The initial prime application was run out for 4½ miles, with the bitumen penetrating about ¼ inch into the base course. After the cutback asphalt had cured out for 3 days, the bituminous surface-treatment work got under way. The usual procedure was to keep about 3 miles ahead with the prime, and to keep the first treatment one mile ahead of the second treatment, and the second treatment one mile ahead of the seal. In this way the entire paving operation moved progressively from the south end to the north end of the contract.

For the first application of the surface treatment, the distributor shot a 20-foot width of 150-200-penetration asphalt at the rate of 0.35 gallon to the square yard. The bitumen was heated in the storage tank to nearly 350 degrees F so that when it hit the road the temperature was still 330 degrees.

At the start of all bitumen applications, a strip of 60-pound paper, 36 inches wide, was laid across the road to catch the initial discharge from the distributor as the truck got rolling. In this way any concentrated fat spots of asphalt were eliminated.

(Concluded on next page)

STRUCTO

LINE OF CONTRACTORS TOOLS

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DEMOLITION TOOLS

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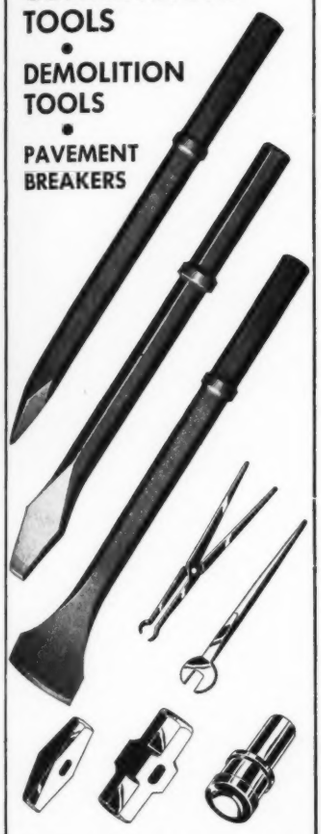
PAVEMENT BREAKERS



All STRUCTO tools are made in the modern Arrow shops by skilled tool makers using only the finest quality steel.

In addition to the tools shown above the STRUCTO line includes air hammer tools, star drills, drift pins and pull pins. All are available in a wide variety of sizes and weights.

Every STRUCTO tool is backed by 37 years experience in making fine tools, plus a generous amount of good service to customers.

Write for Bulletin No. 851 showing the complete line.

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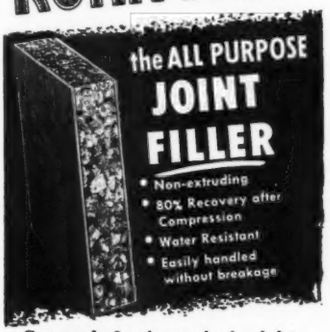
KORK-PAK®*



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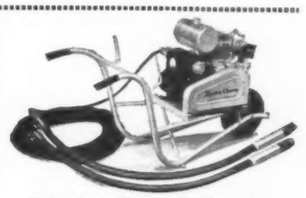

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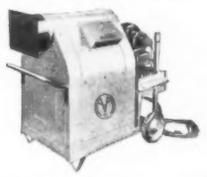

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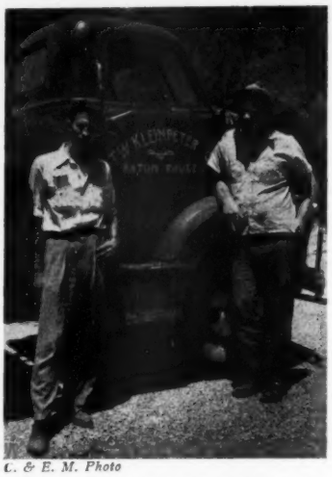
Three-Application Surface Treatment

(Continued from preceding page)

The guide line along the side of the road was not needed by the distributor operator after the initial prime shot, but the rod from the front end of the truck, with the trailing chain, was used for each subsequent application. About a mile of bitumen, in increments of 1,000 feet, was applied in the first of three treatments, with each section being covered at once with gravel aggregate.

Gravel Cover Aggregate

Three different sizes of gravel for the cover aggregate were furnished by the Louisiana Sand & Gravel Co. They were stockpiled near the storage tank where they were loaded into trucks by a Lorain crane equipped with a 40-foot boom and a ¾-yard clamshell bucket. The contractor assigned nine 5-yard dump trucks, either Fords or Chevrolets, to the gravel cover work. All trucks were equipped with built-in tail-gate spreader boxes, but when the trucks reached the section being worked, the regular driver turned the truck over to a special back-up driver who teamed up with a special release man for the operation of the spreader box.



L. & E. M. Photo

Russell Cappo, left, was Inspector on the job for the Louisiana Department of Highways. Clayton C. Gibens was Superintendent for Kleinpeter.

It was found that this special two-man crew did a much faster, and more precise and accurate job of applying the cover aggregate than could the regular drivers, who sometimes got into difficulties while backing the trucks with the bodies in a raised position. In applying the aggregate, an 8-foot-wide lane was covered along each side of the road. Then the remaining 4 feet down the center was covered, using a spreader box that was blocked off to the width desired. All trucks backed over the freshly deposited aggregate on the bitumen so that the wheels rolled on the cover aggregate as it was spread.

The gradation of the three sizes of cover aggregate used on the contract was as follows:

Sieve Size	Per Cent Passing		
	C-1	C-2	C-3
1½-inch	100	....	....
1-inch	85–100	....	....
¾-inch	40–80	....	....
⅜-inch	....	95–100	....
½-inch	0–50	90–100	100
⅜-inch	....	40–80	95–100
No. 4	....	0–15	40–70
No. 10	....	0–3	0–15
No. 16	....	....	0–5

Brooming and Rolling

C-1 cover aggregate following the first application of the surface treatment was put on at the rate of 0.018 cubic yard per square yard. Gravel was rolled in by two smooth-wheel rollers —an Austin-Western 8-ton tandem and an Ingram 5-ton 3-wheeler. Before the second treatment was undertaken, the surface was carefully broomed and rerolled to eliminate any loose gravel lying on top. Great emphasis was placed on both hand and drag brooming to prevent loss of gravel off to the shoulders. This attention to brooming was worth the effort to keep the gravel on the surface where it belonged, instead of being whipped off to the shoulders, slopes, and ditches where it meant a decreased thickness of mat and, of course, poorer riding qualities.

In this operation, five men with hand brooms worked along the edge of the road to push back the gravel from the shoulders. They also smoothed over any rough spots in the surfacing. But for large-scale distributing and leveling off of loose cover stone, the contractor used a Grace drag broom pulled by a Minneapolis-Moline rubber-tired tractor. The drag broom was 12 feet in width across the road x 7 feet long, and was made of a wooden frame with 6-inch wire bristles. Both the two cross members and the two diagonal members of the frame had rows of bristles.

For the second treatment, 150-200-penetration asphalt was shot at the rate of 0.3 gallon to the square yard at 330 degrees F, and covered with 0.011 cubic yard of C-2 gravel per square yard. Rolling, brooming, and rerolling followed as with the first treatment, the same careful consideration being given to the retention of cover aggregate on the surface. The second treatment moved ahead in 1,200-foot sections. The third treatment or seal coat consisted of a 0.2-gallon application of 150-200-penetration asphalt covered with C-3 gravel put on at the rate of 0.0075 cubic yard per square yard. The seal progressed in 1,500-foot increments that included the same rolling, brooming, and rerolling.

Quantities and Personnel

The 10.3-mile bituminous surface treatment was completed in June, despite some delays caused by the heavy traffic of sand and gravel trucks using the road. Traffic was maintained over the project, and the sand trucks in particular often dripped water that first had to be dried out before the bituminous work could go ahead.

Major items in the highway improvement on Louisiana State Highway 37 included the following:

Gravel base course	38,500 cu. yds.
P-1 prime	31,700 gals.
Asphalt cement (150-200 penetration)	108,686 gals.
C-1 aggregate	2,415 cu. yds.
C-2 aggregate	1,340 cu. yds.
C-3 or seal-coat aggregate	906 cu. yds.

T. W. Kleinpeter Co. employed an average force of 22 men on the project under the supervision of Clayton C. Gibens, Superintendent.

For the Louisiana Department of Highways, G. D. Landry was Project Engineer, assisted by Russell Cappo, Inspector. The Department is headed by R. B. Richardson, Director, with N. E. Lant, Chief Engineer, and E. J. James, Construction Engineer.

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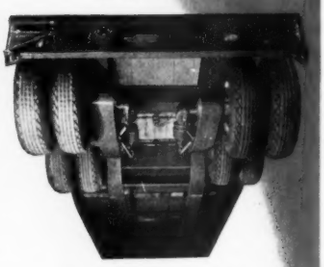

A worms-eye view of the sturdy rear end and frame construction of the famous "T".

The rear end design of the Type "T" has proved so efficient it has been adopted as standard construction in Rogers Power-Lift Detachable Gooseneck Trailers.

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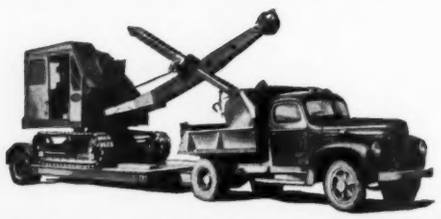
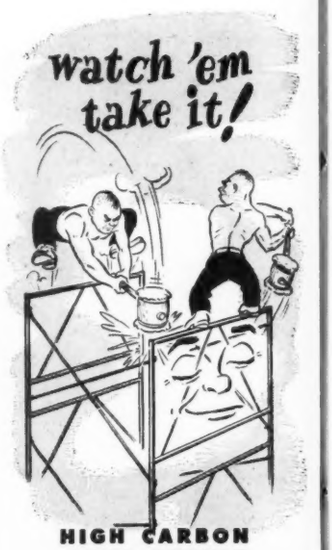


Also of timely interest is this ROGERS Tag-A-Long trailer which makes a dump truck serve as a tractor and effects sizable savings for contractors.



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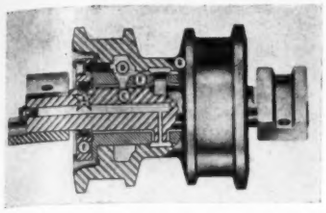

Features of the DE Series of Carroll dirt-excluding track rollers are shown in this cutaway view: (a) dirt-excluding seal; (b) one-piece shell; (c) center thrust-type shaft; (d) grease reservoirs; (e) bronze bushing; and (f) seal housing.

Track Roller Has Dirt-Resisting Seal

A series of interchangeable track rollers is now being manufactured by Craig Carroll Co., 1704 S. E. 22nd Ave., Portland 15, Oreg. They feature a "dirt-exclusion" sealing principle and a one-piece shell of manganese alloy steel.

According to the company, the special seal excludes dirt by allowing grease to flow outward between the blocks and the seal housing. Extra grease reservoirs are built into the shell. The one-piece roller shell is made in a uniform-section steel casting, and, together with the shaft and bearings, is interchangeable for use in Caterpillar rollers.

Further information on the DE Series may be secured from the company. Or use the Request Card at Page 16. Circle No. 507.

Mobile Paving Repair Unit

An 8-page catalog outlines the merits of the Patchmobile, a portable hot-patch paving repair unit, made by Wylie Bros., Inc., 1840 W. Reno, Oklahoma City, Okla. It points out that this unit is fully equipped to enable a semiskilled paving crew to make durable spot repairs in just a few minutes; tools and mix can be kept at proper working temperature regardless of weather.

The Patchmobile makes possible immediate repairs and thereby eliminates extensive damage to pavements. The Model PM-200 can produce from 1 to 2 tons of hot patch material per hour. The literature describes the unit in detail and includes on-the-job photographs and complete specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 410.

Convention Calendar

February 25-28—AGC Meeting
Annual Convention, Associated General Contractors of America, Statler Hotel, Detroit, Mich. H. E. Foreman, Managing Director, Munsey Bldg., Washington 4, D. C.

February 26-28—ACI Convention
Annual Convention, American Concrete Institute, Netherland Plaza, Cincinnati, Ohio. American Concrete Institute, 18263 W. McNichols Road, Detroit 19, Mich.

March 3-5—Utah Highway Conference
Highway Engineering Conference and Road Show, University of Utah, Salt Lake City, Utah. A. Diefendorf, Head, Dept. of Civil Engineering, University of Utah, Salt Lake City, Utah.

March 3-7—ASCE Convention
New Orleans Convention, American Society of Civil Engineers, St. Charles Hotel, New Orleans, La. Don P. Reynolds, Assistant Secretary, 33 W. 39th St., New York 18, N. Y.

March 3-7—ASTM Meeting
Spring Meeting and Committee Week, American Society for Testing Materials, Hotel Statler, Cleveland, Ohio. C. L. Warwick, Exec. Sec., 1916 Race St., Philadelphia 3, Pa.

March 4-7—AHONAS Convention
Annual Convention, Association of Highway Officials of North Atlantic States, Hotel Traymore, Atlantic City, N. J. A. Lee Grover, Secretary-Treasurer, State Highway Department, 1035 Parkway Ave., Trenton, N. J.

March 11-14—Roadside Development Course
Third Annual Short Course Conference on Roadside Development, Louisiana State University and Louisiana Department of Highways, Old Peabody Hall, Baton Rouge, La. T. Slack, Roadside Development Engineer, Louisiana Department of Highways, Baton Rouge 4, La.

March 19-21—N. Y. Highway Engineers
Annual Convention, New York State Association of Highway Engineers, Hotel New Yorker, New York, N. Y. Convention Secretary, Harry Spitzer, Box 38, State Office Bldg., Babylon, Long Island, N. Y.

April 1-4—New York Safety Meeting
Annual Convention Greater New York Safety Council, Hotels Statler and New Yorker, New York, N. Y. Paul F. Stricker, Executive Vice President, 60 E. 42nd St., New York 17, N. Y.

April 2-5—Roadside Development Course
Annual Short Course on Roadside Development, Ohio State University and Ohio Department of Highways, Columbus, Ohio. W. J. Garmhausen, Chief Landscape Architect, Ohio Department of Highways, Columbus 15, Ohio.

April 7-9—Lubrication Meeting
Annual Meeting and Lubrication Show, American Society of Lubrication Engineers, Hotel Statler, Cleveland, Ohio. W. F. Leonard, Secretary, 343 S. Dearborn St., Chicago 4, Ill.

April 14-17—Purdue Road School, Road Show
Annual Road School, Purdue University, Lafayette, Ind. Prof. Ben H. Petty, School of Civil Engineering, Purdue University, Lafayette, Ind. Also, Road Show, Indiana Highway Materials and Equipment Association, Purdue Armory, Lafayette, Ind. Tom Goby, Secretary, Highway Materials and Equipment Association, 310 High St., Bloomington, Ind.

New Antirust Paint

An improved rust-preventive paint is announced by United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12, Ohio. It will dry in 10 minutes under normal drying conditions and one coat completely hides the old metal surface, the company says, thus reducing painting costs up to 50 per cent.

The new formula, it is claimed, will withstand temperatures from minus 100 degrees F to plus 250 degrees F and is exceptionally resistant to salt air and fumes. It may be applied over damp surfaces, interior or exterior, galvanized metal, and new or rusted metal surfaces of all kinds. The one-coat fast-drying process leaves a semigloss finish and the paint is available in several colors plus aluminum.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 517.

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Catalog on House Mover

A folder describing a new house-moving unit has been issued by Schuette Builders Co., Wausau, Wis. It tells how the Super-Hauler loads and transports large houses, fabricated assemblies, equipment, and industrial units to new foundation sites.

The steel trailer, which has a capacity of about 50 tons, can be made with girders up to 44 feet long, and is pulled by a standard 3 to 5-ton truck. Adjustable front and rear wheel assemblies eliminate the need for raising, moving, and lowering the load into the trailer.

This literature may be secured from the company, or use the Request Card that is bound in at page 16. Circle No. 522.

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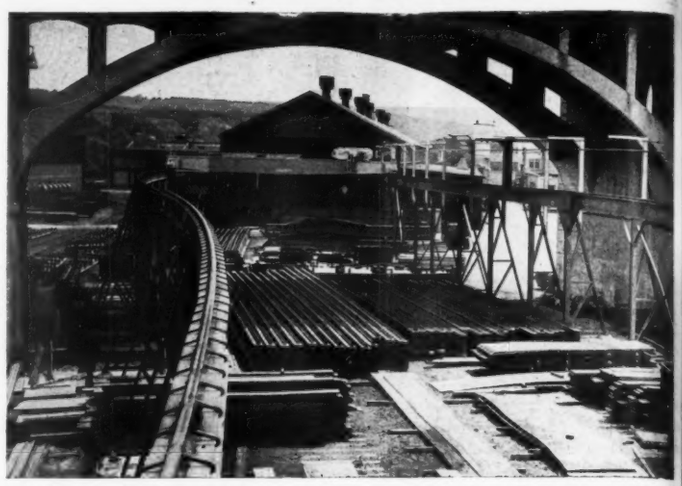

Lehigh Structural Steel Co.'s crane runway goes around an S-curve to avoid a bridge pier. Separate rails 10 inches apart and overlapping at transfer points, allow a switch from one set of wheels to another of smaller diameter. The crane cabs are specially designed to clear the archway.

S-Curve Crane Runway

The only crane runway in the United States with a reverse curve is the claim made by Lehigh Structural Steel Co., for the new runway at its plant in Allentown, Pa.

The unusual structure came about as a result of a problem the Lehigh engineers met when they wanted to extend a crane runway north of a Lehigh River highway bridge. A straight-line extension would have been halted by one of the bridge piers; so the engineers designed a crane that would run over a reverse or S-curve around the pier.

Shepard Niles Co. built the two cranes and hoisting equipment for Lehigh. To travel the 456-foot runway the cranes use two sets of wheels of different diameters on the end of each axle on each end truck. The larger wheel, traveling on the outside or longer rail, is 1¼ inches larger in diameter than the smaller wheel, and the switch from one set of wheels to the other is accomplished by using separate rails 10 inches apart and overlapping 3 feet at transfer points. This enables the smaller wheels to come in contact with the inside rails at the beginning of the curve. Both cranes are 15-ton capacity with 5-ton auxiliary hoists, and the cabs are specially designed to clear the bridge archway. The cab window at the floor is 20 degrees off the vertical to increase visibilty for the operator.

Air Controls Permit Easy Crane Handling

Southern Materials Co. of Richmond, Va., recently installed a pneumatic control system on one of its 20-year-old revolving cranes. Air-powered actuators, instead of a mechanical lever system, now apply clutches and brakes on the boom, holding line, closing line, and cab brake.

The new Westinghouse Air Brake Co. air controls were specified when the regular operator became ill and substitute operators of less weight and strength were unable to handle the crane satisfactorily. Formerly operated in a standing position because of the 4-foot hand levers and the weight required on the foot pedals, the crane is now readily handled by a seated operator. Maximum force on all pneumatic controls is 10 pounds.

A 5-hp compressor delivers 80 pounds of air pressure to the actuators. On the operating lever a back pressure of 8 psi is used in lieu of springs for returning levers and pedals. On the foot-operated holding and closing-line brakes a preload of 5 psi is applied to give quick action and to minimize friction in the rigging or cylinders. These adjustments give the operator a better sense of feel and permit more accurate functioning of the equipment, Westinghouse says.

A safety feature of the new control system is the automatic application of brakes when and if the air-supply pressure drops below 50 psi. This could occur in the event of a broken line in the main control system, compressor failure, excessive use of air, or other accidental cause. Conversion is simple since the pneumatic cylinders and controllers can be mounted almost anywhere in any position. Air lines may be located wherever space permits.

Further information on these air controls may be secured from Westinghouse Air Brake Co., Wilmerding, Pa. Or use the Request Card at page 16. Circle No. 436.

Student Reference Data On Compressed-Air Power

A 21-page reference booklet, "Compressed Air Power in Construction", has been issued by the Committee on Engineering Education of the Compressed Air & Gas Institute, 1410 Terminal Tower, Cleveland, Ohio. It is directed to all men in the field and to students of structural and related branches of engineering.

The booklet, punched for insertion into standard 3-ring binders, cites the many uses of compressed air in construction: bolting, cement spraying, conveying, demolition, digging, hoisting, pile driving, riveting, rock drilling, etc. It describes and illustrates air-operated tools and methods for measuring their performance. It also covers the types of air-compressing equipment used, explaining how compressed air is distributed to the tools.

As an example of the presentation, rock drilling is covered as follows, by means of text, cross-section drawings, photographs, diagrams, and tables: functional parts of the rock drill; sizes, weights, and applications for hand-held rock drills; air consumption of drifter drills; types of detachable bits used for drilling; and drilling procedure.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 450.

Cutting Oils and Bases

To aid in the selection of a proper straight cutting oil or a base for specific operations, E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa., has issued a 4-page bulletin which gives general recommendations for the Cut-Max series of fortified and concentrated cutting fluids. It describes eight Cut-Max oils and bases.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 435.

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Here's Why rubber-tired TOURNADOZER will make more money for YOU

① this job-proved dozer on rubber "runs" at 19 m.p.h.

Instead of "crawling" at 4 to 8 m.p.h., Tournadozer has top speed of 19 m.p.h. — maneuvers twice as fast — dozes twice as fast as the average crawler. It gives you reverse speeds up to 8 m.p.h. . . . cuts deadhead cycle time of most crawlers by 2.5 to 1. And, you get far more use from these greater working speeds, because you have instant speed selection and can change into higher gears any time without shifting or stopping.

② big tires give greater traction and increased flotation

Giant 21.00 x 25 low-pressure tires give you increased traction and flotation in all types of soil. 186 h.p. push on 4-wheel drive moves heavier loads. Instant speed change eliminates stops for shifting . . . keeps vital momentum . . . takes you through soft spots. Extra equipment includes down-pressure blade for cutting hard materials and more accurate grading; also torque converter for smoother, more effective application of power.

③ Tournadozer's high-speed mobility puts waiting periods to work

When needed on scattered odd jobs, operator just hops on this big dozer . . . and drives down paved right-of-way or across the pit to his next assignment. One Tournadozer frequently handles clean-up for 3 or more shovels . . . sometimes maintains widely-scattered dump areas, as well. Pushers often do road maintenance during normal waiting periods.

④ drives via highway on job-to-job moves

Tournadozer drives cross-country, along tracks, over highways at speeds up to 19 m.p.h. No blocking, no waiting for trailer, no loading or unloading delays. Big tires prevent damage to pavement, curbing, tracks, etc. Multi-disc 4-wheel air brakes and fingertip electric steering control give operator confidence to use top speeds while traveling or when dozing over edge of bank.

⑤ Tournadozer is easy to operate . . . easy on the operator

All controls are easy to reach, easy to handle. Operator sits up front, ahead of diesel engine . . . can see where he's going . . . what he's doing. No stretching, no twisting, no end-of-day fatigue slowdown. Driving one of these high-speed Tournadozers is easier than driving a truck . . . and much less work.

⑥ Tournadozer works and earns during the off-season

Winter or summer, it's easy to get sub-contracts or rentals for Tournadozer. Coal stockpiling, county and city snow plow work are particularly good markets. Just use standard Bulldozer blade or any of 9 auxiliary tools — including V-type Snow Plow, Angle-dozer, Side-Boom Crane, Logging Winch, Rooter and Scraper. With each unit, Tournadozer's high speeds and rubber-tired mobility will pay off in more work done.

LET R. G. LeTOURNEAU, INC., Peoria, Illinois

HIGH SPEED RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT